

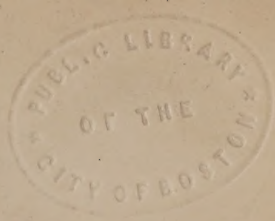
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AN
ILLUSTRATED TREATISE
ON
THE ART OF SHOOTING,
WITH EXTRACTS FROM THE
BEST AUTHORITIES.

BY

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CHARLES LANCASTER,

GUN, RIFLE AND PISTOL MANUFACTURER,

151, NEW BOND STREET, LONDON, W.

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Preface.

AT the special request of many gentlemen who have placed themselves in my hands for instruction in the Art of Shooting, I have written this treatise. I have endeavoured to meet the special requirements of those who are anxious to become proficient in the art, and who have hitherto been unable to obtain, in a precise form, the information necessary for studying the first principles of shooting at moving objects.

I have had the honour of coaching many gentlemen, and have carefully studied the points especially requiring attention that have cropped up from time to time while giving instruction. I hope that those who favor me by studying this treatise may quickly gain the knowledge so essential for the making of an average if not brilliant shot.

I have purposely refrained from touching on the several merits of any class of gun—being a gun-maker myself; and, indeed, so many good works on the subject have been written, that it is really unnecessary.

I trust that authors from whose writings I have made extracts will pardon me when they recollect that I have at heart one object, viz., the advancement of a manly sport which gives pleasure, health and occupation to many, and to the patronage of whose followers I am indebted for many pleasant days.

C. L.

151, NEW BOND STREET,
LONDON, W.,
1889.

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Illustrations.

The Illustrations are drawn by JAMES TEMPLE, Esq., from instantaneous and other Photographs taken at Charles Lancaster's Private Shooting Grounds, by Messrs. H. & R. STILES, of High Street, Kensington.

THE ART OF SHOOTING.

PART I.

GENERAL INFORMATION.

AMONG the requisites for successful shooting is, first of all, judgment of pace—or, in other words, the rate at which the object to be shot is travelling; then getting the proper allowance, so as to ensure the charge of shot from the gun being put exactly where this moving object is likely to be on impact—in the same way as a school-boy learns instinctively by practice, when playing such a game as rounders, where to throw the ball so as to hit or “scorch” the individual running.

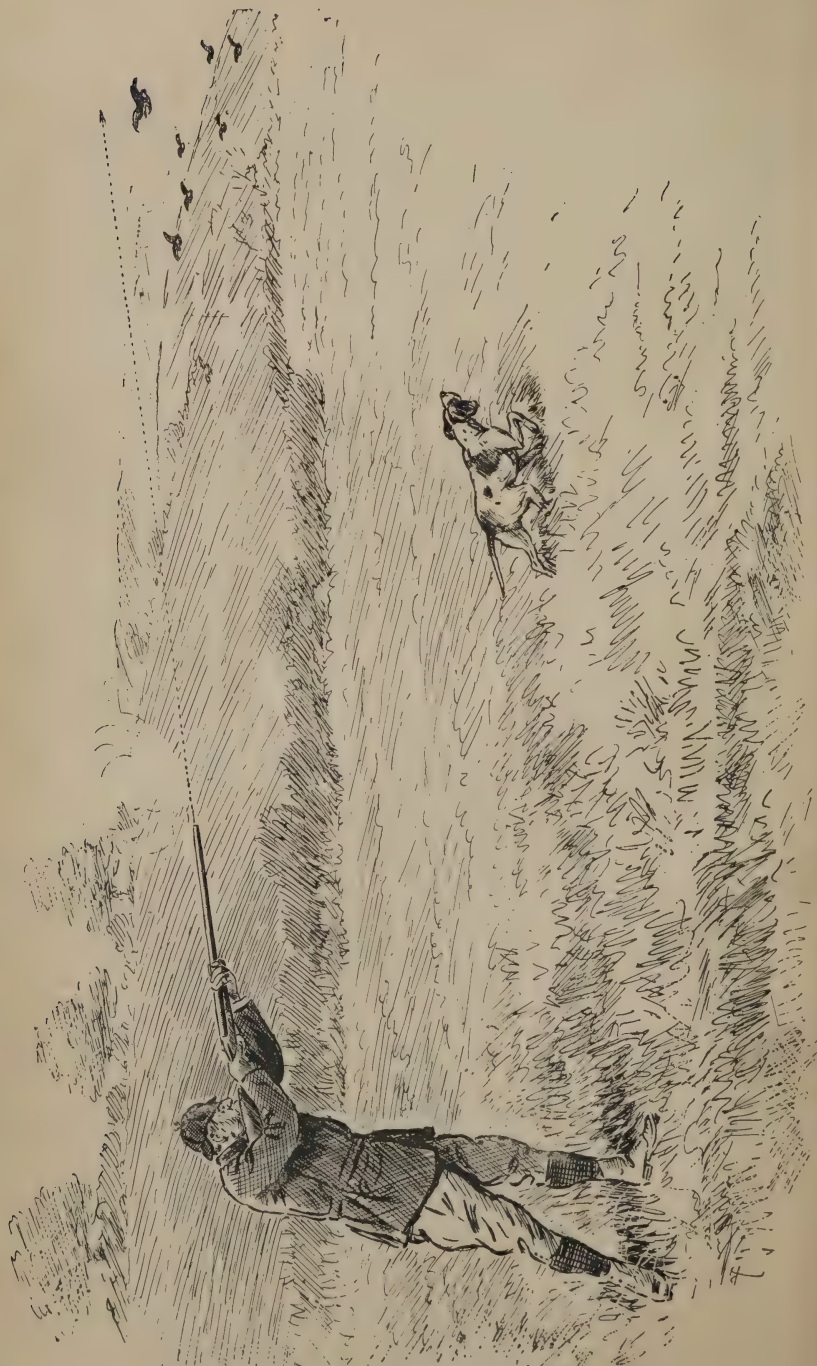
Secondly, angles have to be considered; and I have in the accompanying sketches endeavoured to put them in as simple a form as possible, so that those wishing to see them clearly may do so. These angles

have been worked at and proved correct after much study and hard work, and will, I hope, save the novice much trouble: they may never have had a thought bestowed on them before, and yet they are most essential for the purpose of becoming a good shot.

Thirdly, the sense of touch plays a most important part in shooting. In the use of a gun, the instant the sight and aim have done their work, the finger must pull the trigger to discharge the gun; if too hard in the pull-off, time is lost and the judgment beaten; if too light, the gun may be discharged too soon, and possibly not "within a mile" of the place where the sight and aim had intended it should be placed at the impact of the charge of shot on the object to be struck.

Lastly, a good fit in a gun is as necessary for a successful shot as a well-fitting shoe is for a pedestrian. Some men are smaller than others, and a man must have his gun to fit him the same as his clothes; consequently the gun that fits one may not fit another. Men's likes and dislikes, too, are as different as their faces, and what suits one will not suit another. To test if a gun is really a fit, pin a piece of white paper on a wall or a tree, then put the gun





up at it quickly, with both eyes open, and after several such trials one can tell how the gun suits. If it mounts too high, the stock is too straight (*see Ill. No. 1, opposite*)—if low, the stock is too bent; if to the left, stock should be cast-off to the right—if to the right, it should be cast-on to the left; if the stock catches in bringing it up to the object, it is too long and wants shortening (*see Ill. No. 1, opposite*). To ascertain the latter, by leaning forward from the hips a gun that is too long can be mounted to its proper place, and by gradually returning to the upright position, until the gun catches, the excess of length may be demonstrated. A tall man will require more bend and length than a shorter one; and a stout man will require more cast-off than a thin one. In selecting a gun the buyer must at all times bear in mind that there is a handicap in weight and bore of guns, as in all sports where fatigue and accuracy come in; therefore one man can use a gun at 7 or $7\frac{1}{2}$ lbs., whereas another can only carry say 6 lbs. But a 12-bore gun of 6 lbs., or under, must, as a scientific necessity, recoil and jump more than the heavier ones; it is better therefore to use a smaller load, or a gun of smaller bore, than to shoot with a gun that is very likely to

tell its tale against you in excessive recoil, because no one can shoot even moderately well if he is getting punished.

Some of the matters here briefly touched upon, will be dealt with more fully in subsequent pages.

SIGHT AND ITS PECULIARITIES.

To make an average shot, it is first absolutely necessary to be in a condition to see clearly any object up to, say, 50 yards.

Those who cannot see to shoot without spectacles, should use those having the glasses or pebbles made circular, with a diameter of not less than $1\frac{1}{2}$ inches, and well set out from the face at the lower part, so that when the head is in the correct position, with the gun at the shoulder, the surfaces of the glasses are at right angles to the barrels. Then it must be ascertained which eye is the master, or, in other words, whether it is the right or left eye that finds the object most quickly.

To ascertain this, take an ordinary finger ring, and hold it out at some distance from the face, so that a small object (*see Ill. No. 2, opposite*) can be seen through it about five or six yards distant, keeping both eyes open. Keep the hand and ring perfectly steady, then close the left eye, and if the right eye sees the object as exactly central through the ring, that is the master eye (*see fig. 1*). Then open the left eye and close the right; the line of sight through the ring, as shown in the red line (*fig. 1*), will incline to the right towards A, that was seen to be central when using the right eye with the left closed (*see Ill. No. 2, fig. 1*).

Then reverse the operation (*fig. 2*), but after focussing the object (*see fig. 2*) through the ring, keeping the hand and ring perfectly steady, close the right eye, and if the left eye sees the object as exactly central through the ring, then the left is the master eye (*see fig. 2*). Then open the right eye, and close the left; this should cause the line of sight through the ring, as shown in the red line (*fig. 2*), to be carried some distance to the left hand (to letter A, *fig. 2*), that was seen to be centrally aligned when using the left eye with the right closed (*see Ill. No. 2, fig. 2*).

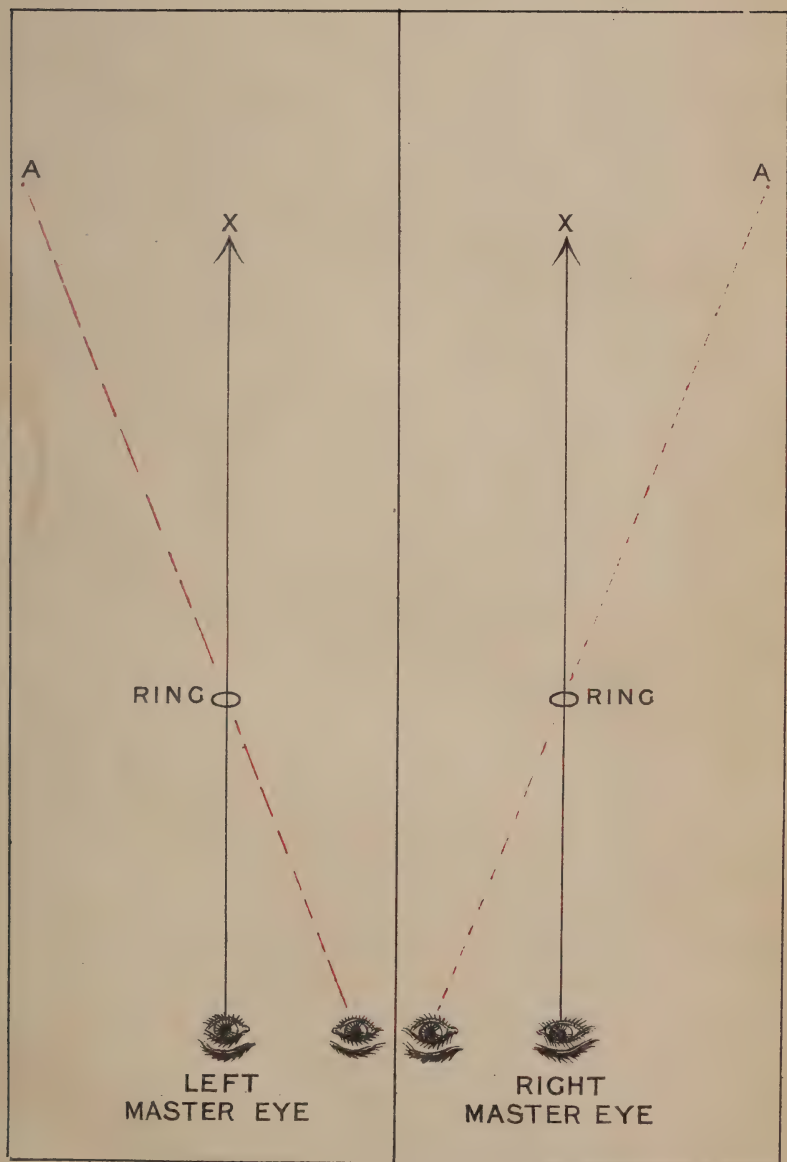
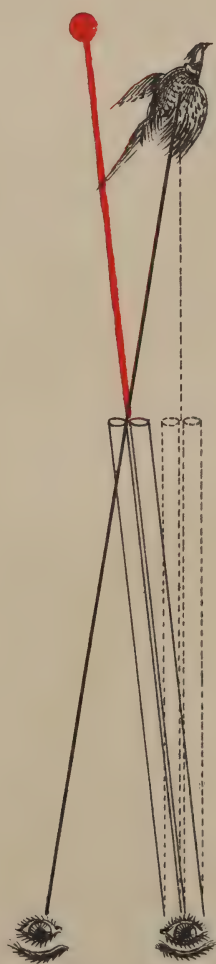


FIG 2.

FIG 1.



LEFT EYE. RIGHT EYE.

No man with a more powerful left eye than the right can be expected to take a perfect alignment with the right eye, or to shoot with a gun, unless the centre of the rib of the barrels comes absolutely opposite to it. If he has a right-eyed gun, the left being the master eye, it would cause him to shoot from 1 to 12 feet to the left of the object, according to the distance he gets away (*see red line, Ill. No. 3, opposite*). To correct this error, he must close the left eye, causing the gun to be brought from point O back to cover properly the bird, so that in shooting at an object crossing from R to L he would be ahead of it, and with a better chance of hitting it, but if crossing from L to R he would be a great deal behind it, and consequently miss it. This may be owing to too little cast-off even to a right-eyed man. The subject of cast-off, however, can hardly be treated off fully at this point, and will be referred to again hereafter.

CARRYING AND LOADING A GUN.

I consider it half the battle, where a gun has to be carried all day, over good or bad ground, to understand the easiest method of doing so without undue fatigue, and therefore I submit the illustrations (Nos. 4 and 5) as being likely to convey the idea without a long wordy description; but I prefer the manner so well shown in illustration (No. 5, page 20)—where the gun is being carried on the right shoulder and hand—because it admits of the gun being brought to cover an object immediately without changing the hold or grasp of the stock.



Carrying for a Long Tramp.





Convenient Holding for Loading.

The position for loading a gun, or placing it to half-cock or "safe," should be carefully studied—not only with a view to ease in loading, but more especially that, when in the act of opening the gun to reload (*see Ill. No. 6, opposite*) after having only fired one barrel, or in closing the gun when reloaded, the barrels may never by the slightest chance be allowed to cover or point near dog or man. This I wish especially to impress upon everyone's mind, whether beginner or not, because I have noticed it frequently occur. Should the gun go off by accident, when the gun is pointed in a clear direction, no harm can be done; whereas, if carelessly pointed, a sad loss of limb or life may take place.

HANDLING AND POSITION.

At all times it is best, and most essential, to get a firm hold of the gun with both hands; but care must be taken to notice that, as the left hand has to come over to the right side for a correct alignment, you should not hold the barrels too forward, or the left hand will not come over, and will tend to check the gun from taking a true and square shot. At all times be careful that you have both feet well placed, the left foot slightly in advance of the right, but in an easy position; the body bending forward so that the chin plumbs the left foot—the knees never bent (*see Ills. Nos. 7, 8 and 9*).



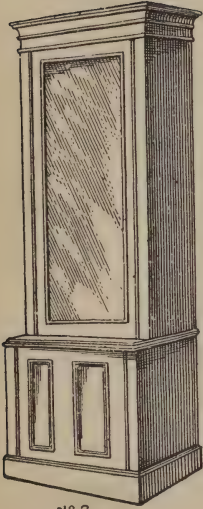


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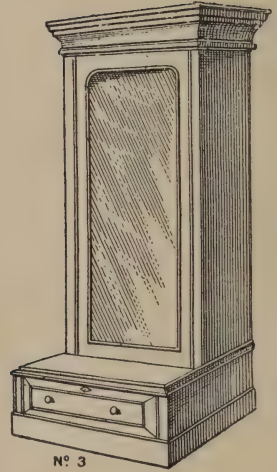
Should, by any chance, a bird go to right or left, be careful to make a complete change of front, *i.e.*, either to left or right half-turn; and always be careful to use the right foot as the pivot, moving only the left from the ground—turning on the right by moving the body to the direction of the flight of the bird (*see Ill. No. 8, opposite*). This allows the body to be square to it, and prevents an unpleasant recoil on the arm, or perhaps a kick on the face, which may be felt the next few shots and cause the shooter to flinch.

Never draw back the right foot; because by doing so the tendency is to draw the gun down too low, thereby causing the shot to go under or behind. In taking up a position at the covert side always find a firm footing—for choice, the left foot should be lower than the right, as it will naturally tend to throw the body forward. The body being forward (*see Ill. No. 9, opposite*) gives greater resistance for the recoil of the first barrel, and allows the gun to mount cleaner without fear of catching, and the body will then be in the upright position for the second; but if the first barrel is fired with the body erect, the recoil will tend to place the body out of balance, and this takes time to correct. The loss of a second means that the bird may have travelled 15 or 20 yards, thereby preventing the chance of a second shot at a reasonable distance.





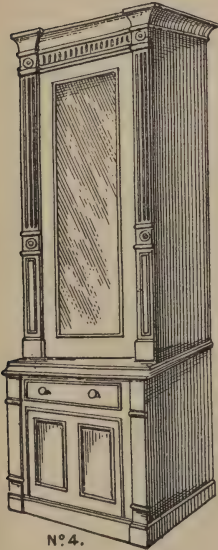
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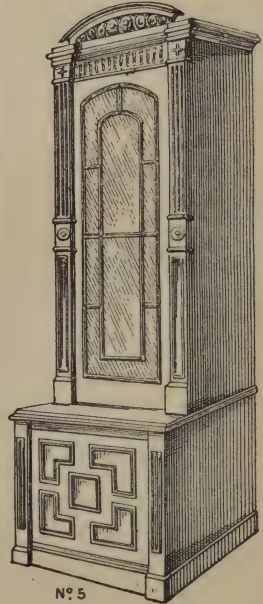
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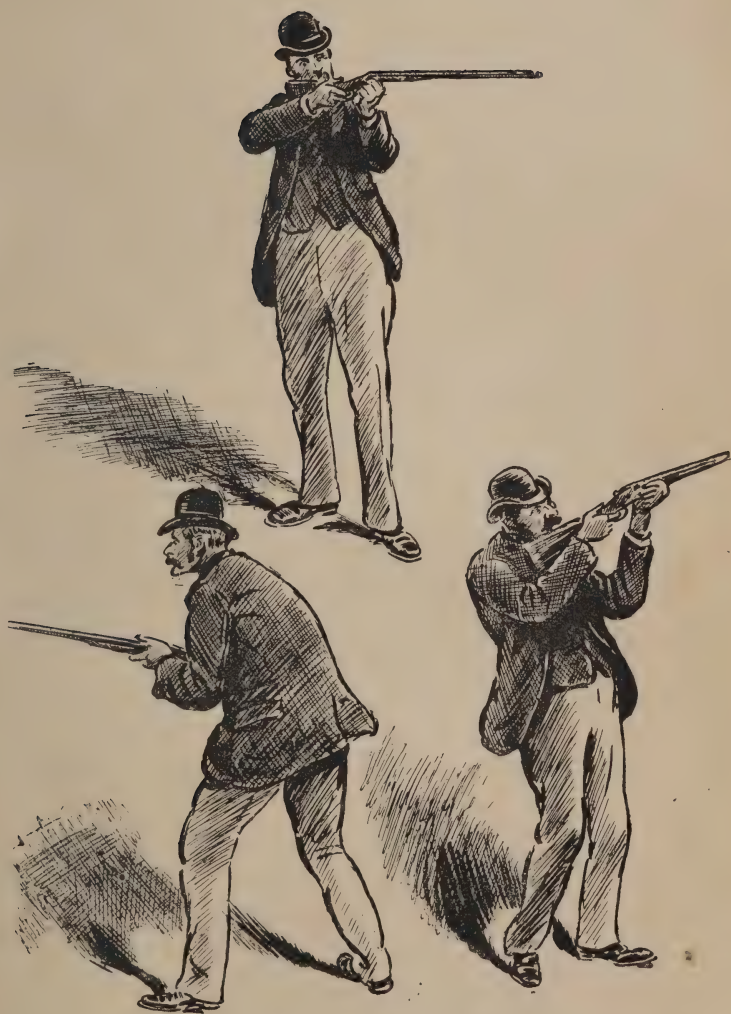
Gun Cases.

ELEMENTARY PRACTICE.

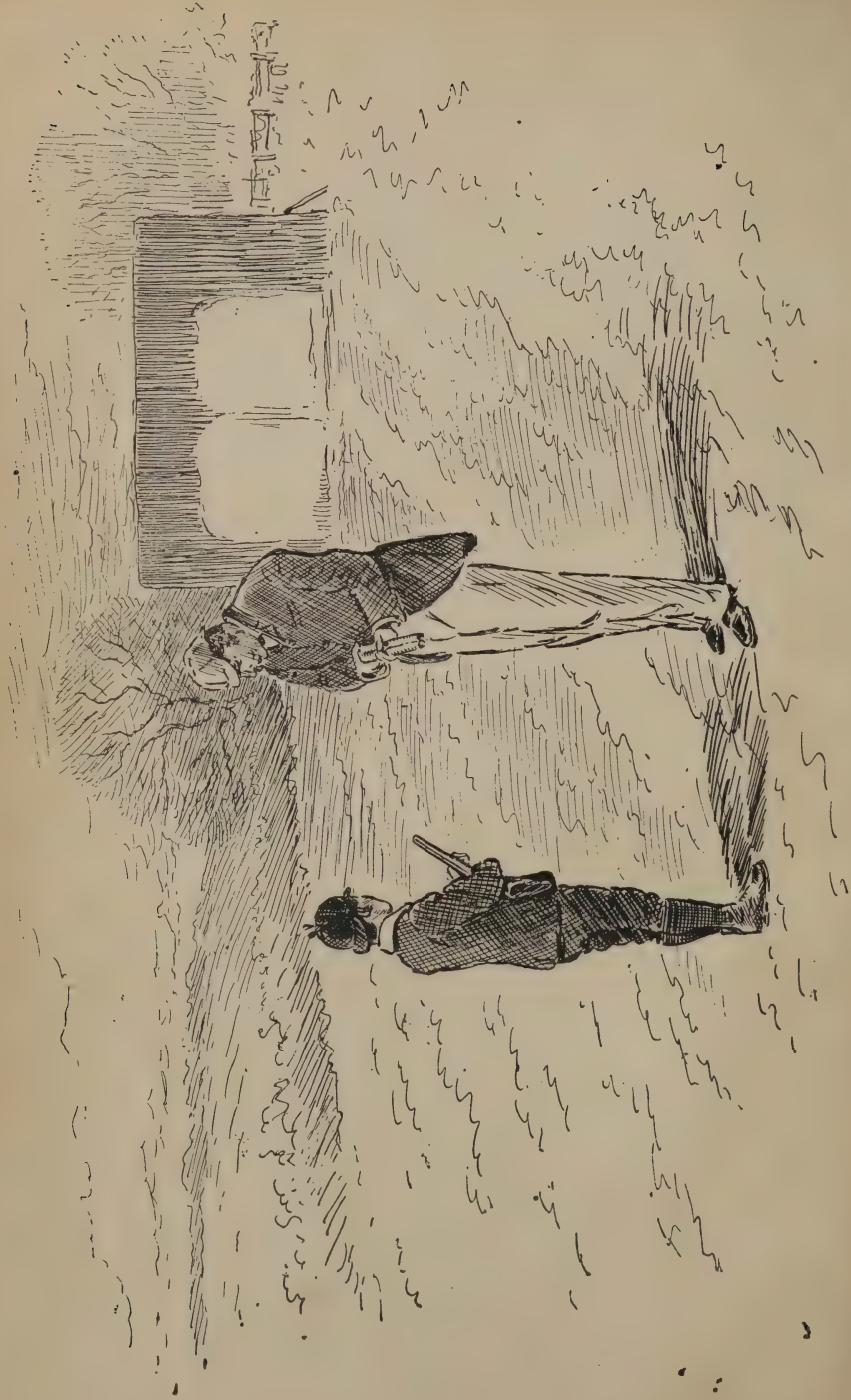
“Practice makes perfect,” is a true and old adage; and in shooting, as in all other sports where ease of movement combined with well-hardened sinews and muscles are requisite, those who practice most will become proficient first. I advise the handling of a gun once or twice a week all the year round, if even for only ten minutes at a time; but oftener than this is necessary for a beginner.

When you have a gun, don't forget it, but keep it in some handy, get-at-able place. Many who really feel inclined to practice, often do not do so, because “it's too much bother to get it from the gun-case,” etc., etc.—whereas, if it is always kept within reach, there is no excuse to be made, and the work is done (*see Ill. No. 10, opposite*).

To the beginner, I say, be most careful how you commence, so as not to get into a bad position (*see Ill. No. 11, opposite*), because that makes the work much more difficult, and very tiring. Take the gun in both hands, the right well held round the hand of the stock, and the left well forward—just to the tip of the fore-end if possible—so that, when the gun is mounted to the shoulder, the left arm is well stretched out (*see Ill. No. 9, page 28*). Be careful to stand well on the feet. Stand in the first position—that is, with the heels touching, and the toes about 6–10 inches apart; then move the left foot half a step forward, and bend the body forward from the hips, so that the chin will plumb the left toe. This will allow the body to be at a convenient angle for the gun to be brought quickly to the shoulder (*see Ill. No. 9, page 28*), at the same time giving resistance for the recoil of the gun, allowing the balance to be kept, and enabling a second barrel to be fired quickly and conveniently when shooting. Then handle and mount the gun to the shoulder, keeping both eyes open and facing some object in the room (such as a picture nail)—do this quickly some few times, taking care to have the finger on the right-hand trigger, ready to pull as soon as the gun is at the shoulder (*see Ill. No. 8, page 25*).



Bad Positions—to be Avoided.



To get a fair pull of the trigger, the finger should be bent, with the first joint resting lightly on the trigger, so as to prevent a snatch pull; and see that the other part of the finger is not touching the stock, or it will cause the pull to be too heavy, and draw the gun out of alignment.

Press the gun to the shoulder with considerable force as it is mounted; this should be done in one movement. After working this covering of the object, swing the gun to another selected mark at about 12 to 15 feet to the left of the first; continue to do this, —reversing the movement left to right. Repeat this mode of practice on and off for some days, and then you will be in a position to fire a few shots at a mark in the open, either on a wall or shot-proof screen made for the purpose (*see Ill. No. 12, opposite*).

In shooting at such a mark, walk three or four steps towards it before firing; and never fire if you feel you are not covering the object you desire to hit. This will enable you to observe what you are doing each time, and allow of corrections being made.

When the fixed mark can be hit pretty frequently, the beginner can proceed to practicing at moving objects.

INANIMATE MOVING OBJECTS.

I know of but one really serviceable appliance for this work, and that is the now celebrated Ligowsky Trap, and Clay Pigeon used from same (*see Ill. No. 13, opposite*); and I certainly think it advisable to caution Sportsmen against buying worthless imitations, which will only cause them much inconvenience and annoyance.

The beginner can place the trap so that the Clay Pigeons will be thrown forward, to the right or left, high or low, or can have the trap worked by an attendant from behind a wall or shot-proof fence—somewhat after the flight of driven birds, or even for high in-coming shots.

Pitch composition balls, as used by “Buffalo Bill” at the American Exhibition—with an attendant standing ready to throw them from the side of the beginner in different directions—also afford good practice; moreover these balls cannot leave any objectionable pieces, likely to damage the feet of cattle, dogs, etc., as is the case with glass balls. The Author supplies special gun-metal moulds for casting



these balls, so that a gentleman having a mould can make the balls at home, thereby saving loss by breakage whilst in transit—which is always a difficult question to contend with.

BIRDS ON THE WING.

After the beginner finds that he can break Clay Pigeons, Pitch Balls, or other inanimate objects, he may proceed to obtain further practice by shooting at small birds, such as starlings, larks, sparrows, etc., either released from a trap or thrown up by an attendant (*see Ill. No. 14, opposite*).

One need not become what is generally known as a "trap-shot" from this method; but by knowing from where a bird will be sprung, a beginner is enabled to become cool and collected, and to take time to see the flying bird well on the wing before he need shoot—especially if he will walk six to ten paces before having the bird released, watch its flight until it has got a fair distance, and then shoot. Then, when a fair score can be made, two birds may be released from separate traps, one just before the other, so as to enable the beginner to get a right and left, and to keep the firing of the second barrel within a fair time of the first. Afterwards both birds may be released at the same time.





Keeping the Gun to the Shoulder for a "Right" and "Left."

Many persons fail in shooting from inability to judge distance. I therefore recommend that, before two birds are released, a good-sized bunch of newspaper should be left on the ground at 40 yards from where the shooter is standing. With practice this will teach what law a bird should have; and when not to shoot, owing to the bird having flown out of range.

Do not take the gun down from the shoulder between the two shots (*see Ill. No. 15, opposite*), because it loses much time, and the bird may have flown out of range; or, in driving, a second shot may be lost.

SHOOTING WINGED GAME.

A great difficulty here presents itself to the Author, because this Treatise is not written with a view of telling the sportsman how shootings should be managed, game reared and found, or ground worked to obtain the best results. Many good works have been written on these subjects, and I refer my readers to the works enumerated on page 190. I will, however, just mention a few of the most important facts to be remembered.

Be careful to carry your gun in such a way that it never covers your left-hand "gun" (*see Ill. No. 16, opposite*), because it is not pleasant to find the line being broken in walking, owing to the left "guns"



Walking in Line—Correctly, and Safe to Others.



hanging back to escape looking down the muzzles of your barrels. In covert, just as much care should be taken, as the careless handling of a gun by one may spoil the enjoyment of a whole party. Etiquette of the field often prevents a word of caution being given to a careless man, although a retiring or shrinking away from the line of his gun may have the desired effect (*see Ill. No. 17, opposite*).

I once was covert-shooting when many dangerous “guns” were present, some not allowing pheasants to rise—thereby shooting dangerously low. One of the party, when shouted at by the head keeper and beaters, actually made the following remark: “What nonsense to say that bird was too low! why, it was at least *eight* feet from the ground” (*see Ill. No. 18, opposite*).





A nice Angle to take them at.



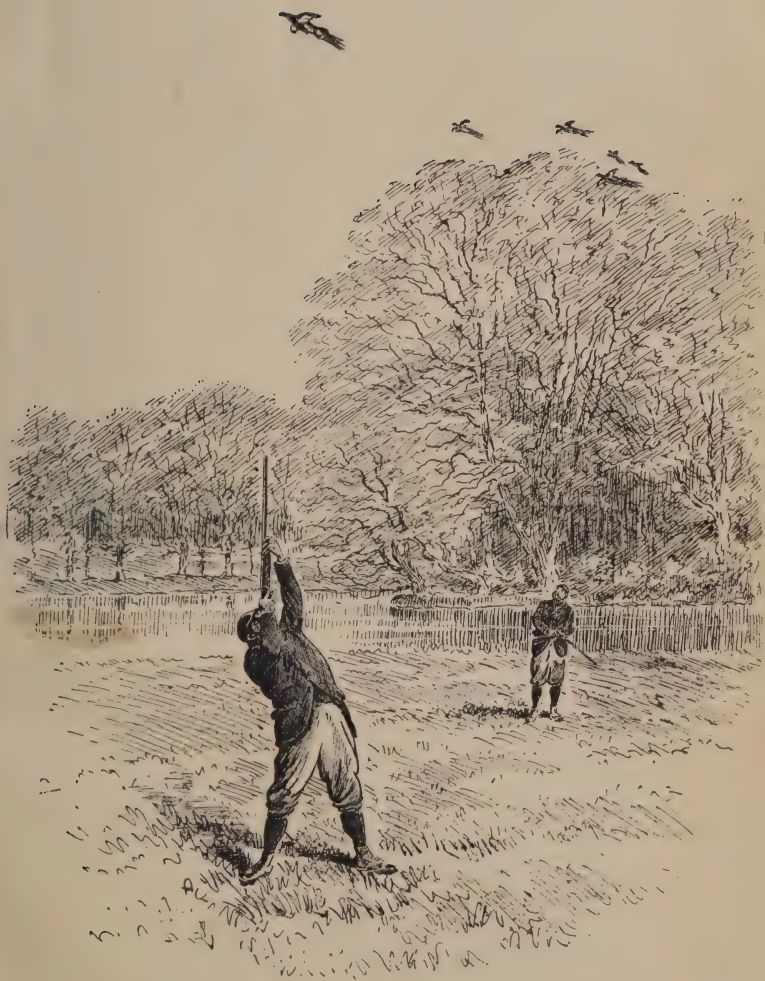
Before the day was out one of the party managed to give me a good “dusting,” under the following circumstances:—A rabbit was seen in the covert we were facing, when suddenly it bolted out into the ride and came towards me in a direct line. I saw the next “gun” about to shoot. I shouted, “Don’t shoot!” but too late; he had fired; the shot glanced from the stony ride and “dusted” me all down one side (*see Ill. No. 20, opposite*).

These shots were made by men who should have known better; and they so impressed themselves on my mind that I cannot help mentioning them here, as a caution to others who might be tempted to shoot in such dangerous fashion. Many persons, however, may probably have had just as unpleasant an experience.

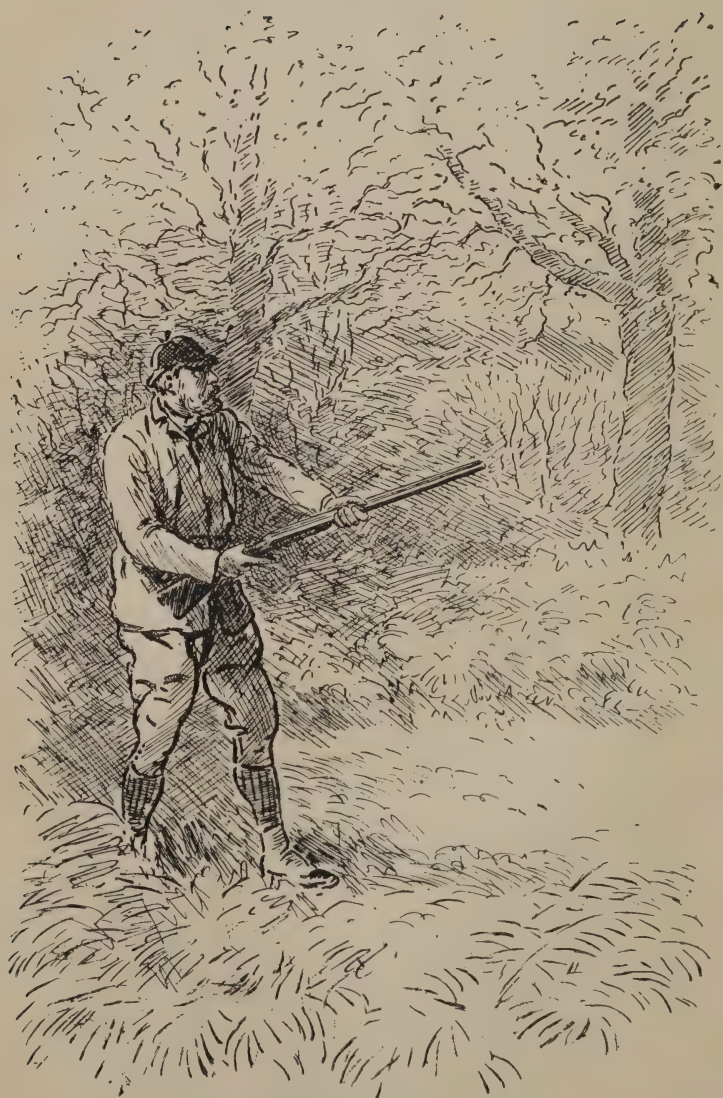
THE PERPENDICULAR SHOT.

To shoot birds well overhead, or perfectly perpendicular, is one of the most telling and prettiest shots to be made (*see Ill. No. 21, opposite*), but one requiring great coolness and a certain amount of practice. When learnt, however, such a shot is not difficult, as by waiting it gives plenty of time to get ready—the bird having been seen, at some distance away, as it approaches.

When shot in this way the birds are more often well killed, as they present the most vulnerable parts to the shooter. If birds are flying at a great pace, and high, a good allowance in front must be made, or the bird will be missed.



Shooting well back overhead.



Watching them coming high.



How to get them well overhead.

Standing perfectly steady (*see Ill. No. 22*), and watching the bird approach until it is nearly overhead, the body must then be thrown back so that the whole of its weight is on the right leg, the left toes just touching the ground, so as to steady the shooter (*see Ill. No. 23*, opposite). For this shot, the left hand should be brought down the barrel nearer to the right, so as to allow of the gun being pushed well in line of the right shoulder and right eye ; or else the gun will be drawn to the left, and so lie out of proper alignment, consequently causing the shot to go all to the left.

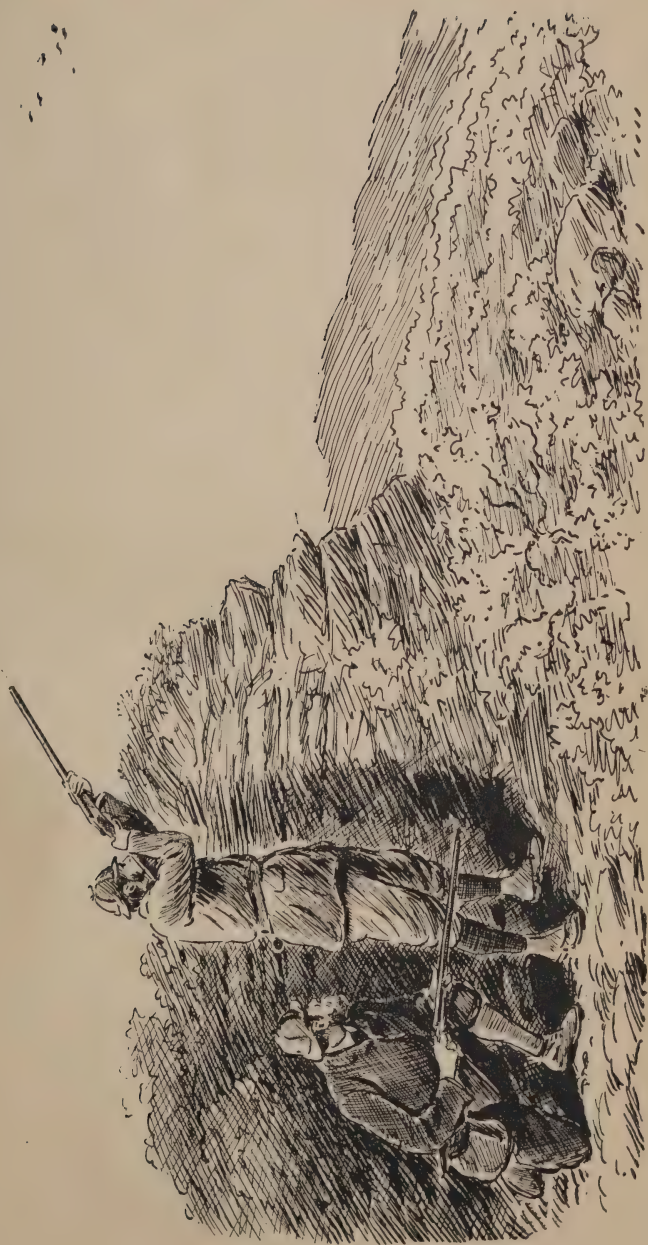
Very few sportsmen are seen to do this class of shooting really well. Many fail because they do not practice the movement sufficiently before they go out, and consequently do not get far enough back—being too stiff; also, because they do not get far enough ahead of the bird at the instant of pulling, but check the gun perceptibly.

THE APPROACHING SHOT.

This is really not a difficult shot to learn, and may be divided into three kinds—the approaching high shot, *i.e.*, above the level of the sportsman's head, the approaching low shot, *i.e.*, below the level of his head, and the direct, *i.e.*, straight on.

The high shot must be made by shooting well in front of the bird's head, if fairly close; but if further away—say 35 to 40 yards—less allowance must be given. Many miss these shots by shooting too much at the bird, and not swinging the gun ahead at the moment of pulling (*see Ill. No. 24, opposite*).

SHOOT HERE





The Approaching Low Shot.

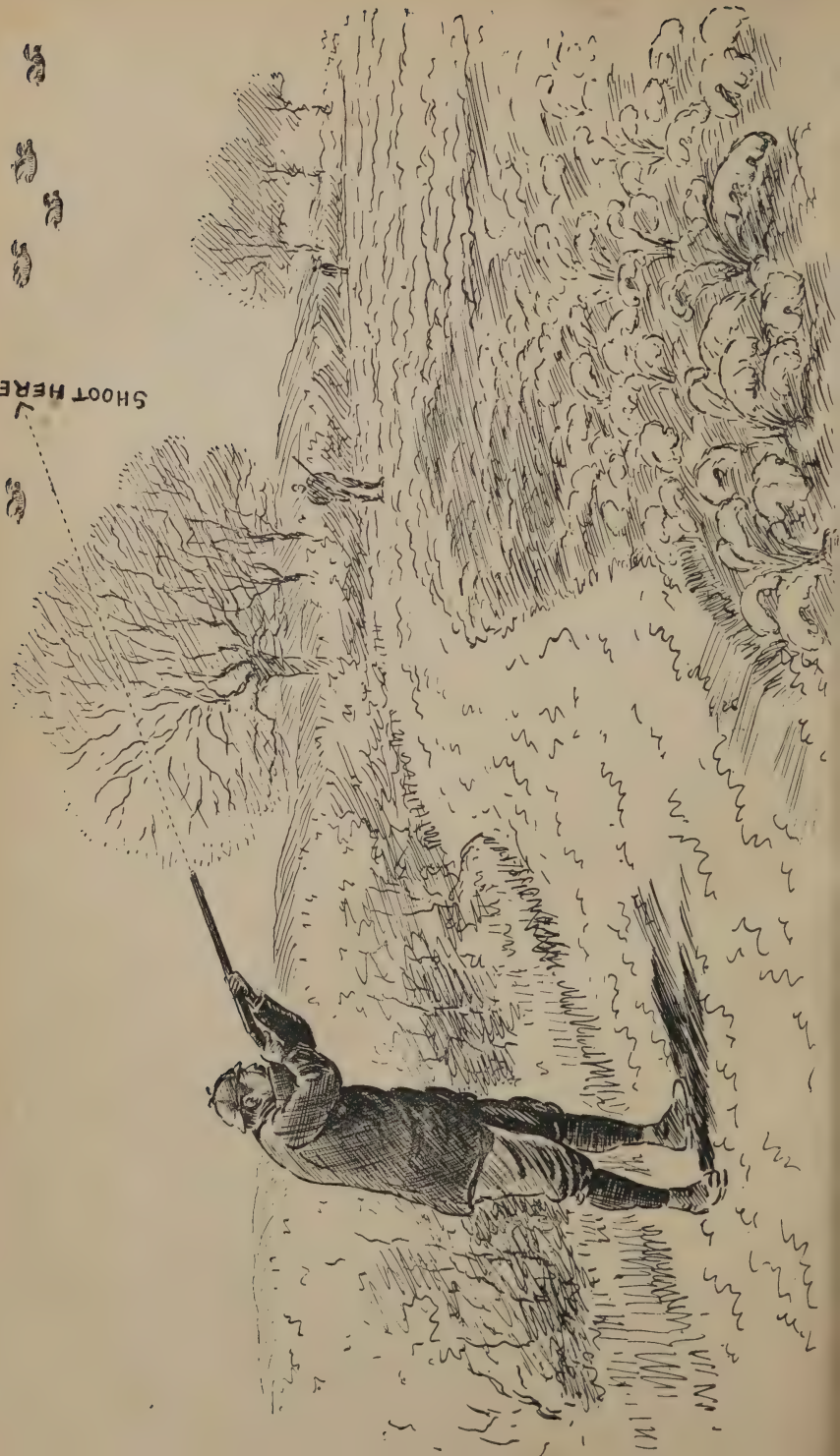
The approaching low shot in partridge driving, where the hedge behind which the shooter is standing is lower than his shoulders, is really difficult, because the bird is often fired at when too far from the gun, or sometimes when much too near.

In shooting at an approaching low-flying bird, the shooter must get his gun well down and under the bird, or he will miss it by firing over—really behind it. Many birds are missed in this way owing to the fact that the gun is not brought enough up to the shoulder (*see Ill. No. 25, opposite*).

To kill well that which is flying directly at the shooter's head, the bird should be covered by drawing a bead on it (*see Ill. No. 26, opposite*), and pulling at once, so as not to let the bird get too close.



SHOOT HERE



THE APPROACHED AND PASSED SHOT.

This kind of shooting often presents itself to the sportsman, especially in partridge driving, when the beaters are getting well up to the guns, so as to prevent the birds being shot at as they approach, lest a beater should be peppered.

If a bird flying high has to be shot after it has passed well overhead, the shooter must be careful to get well under the bird, or ahead of it, so as to prevent shooting behind. This is an easy shot, as the bird is never lost to view (*see Ill. No. 27, opposite*).

If a passed bird is flying low between the guns, the shooter must get well over or ahead of it. This is more difficult than the higher shot, as the bird is practically hidden by the gun, or, in other words, is flying under the line of sight (*see Ills. Nos. 28 and 29*).





SHOOT WELL
AHEAD



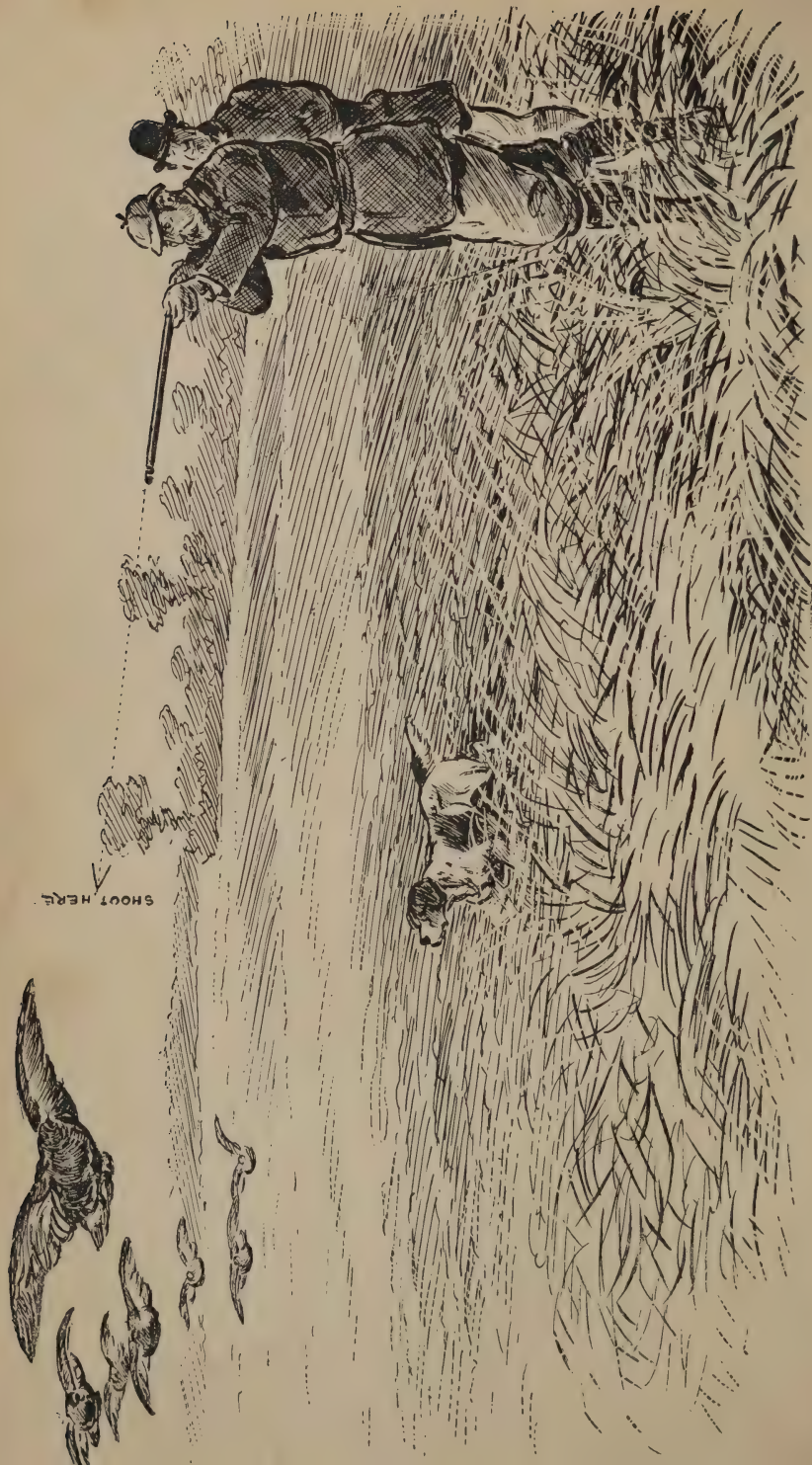
THE CROSSING SHOT.

These are generally easy shots; but the beginner must be careful to shoot only at his own birds, *i.e.*, those that really rise to him, and never shoot a bird that has crossed to the next gun—whether to the right or left—unless he is an outside gun, when he can shoot well round (*see Ill. No. 30, opposite*).

To kill a bird cleanly and well if crossing to the right—generally the more difficult side—get well round, and, if necessary, move the left foot so as to bring the body far enough round, making the right foot the pivot. This will enable the balance of the body to be kept, and admit of the gun being swung ahead again for a second barrel, should the bird be missed with the first (*see Ill. No. 31, opposite*).



SHOOT HERE.



It is not always necessary to move the feet to turn to the left, as it is much easier to swing further and faster to the left than to the right (*see Ill. No. 32, opposite*).

The velocity or flight of a bird must be quickly judged—more in crossing shots than in any other; and an allowance of from three to even ten feet or more must be made, according to the pace of the bird and the distance it is away from the gun. At the longer distances the aim must also be a little over the bird, so as to allow it to be hit, as shot travels on a curve. More elevation is required when shooting up wind, than if shooting down wind.

Longer shots may be made at crossing than at straight-away birds; because shot strikes with greater force at a crossing object than at one which is flying in the same direction as the shot.

THE QUARTERING SHOT.

A quartering shot, as distinct from actual crossing shots, is very difficult; because, when a bird gets up, it may, more often than not, be flying at an oblique or obtuse angle. With these very great practice is required to make a certain kill; because, besides the velocity of the flight of the bird, an allowance has also to be made on the lineal direction of the flying bird.

Care must be taken, with shots of this class, to hold the gun less in front than in actual crossing shots.



THE STRAIGHTFORWARD SHOT.

This class of shot may be considered under three headings—straight-away, high straight-away, and low straight-away shots.

As a rule, the sportsman has time to look well at his bird before putting the gun to his shoulder—especially in the early part of the season, when the covert is good and the birds lie well.

For the straight-away shot, where the bird flies in a bee-line, the gun should be put to the shoulder so as to be about in a line with the top of the back of the bird, if at a distance of 25 yards (*see Ill. No. 33, opposite*); but if at a greater distance, rather more above.

If a bird should fly straight, but having risen higher than the shooter, the gun should be mounted so as to be slightly under the bird (*see Ill. No. 34, opposite*).





SHOOT HERE

If a bird on rising flies very low—just skimming away—then the gun should be mounted so as to be well over or in advance of the bird (*see Ill. No. 35, opposite*); because in this class of shot the tendency is to wait too long before pulling the trigger, and then the bird is missed—owing to the shot striking where it was, rather than where the shooter intended it to be, according to his aim.

THE ASCENDING SHOT.

This is a difficult shot, because the general tendency is to shoot too much point-blank at the bird; whereas, when a bird ascends, it does so at a great pace, and the gun must therefore be mounted quickly, and be well over the bird to be struck (*see Ill. No. 36, opposite*).

SHOOT HERE





A pheasant found amongst roots or in a hedge-row is almost invariably missed, because its flight is so different from that of other game—the bird often being shot in the tail feathers instead of in the body (*see Ill. No. 37, opposite*). Bear in mind, therefore, to shoot well over an ascending bird, and pull directly the gun is at the shoulder. A moment's delay is sure to cause a miss; and it will sometimes be received with hearty laughter from one's friends, to the chagrin of the shooter, who perhaps sees his bird going off with a leg down—if even that; more likely with only a few feathers gently settling to the ground.

THE DESCENDING SHOT.

More care is really required in making a clean kill at a descending bird than perhaps at any other ; because, as a rule, these shots have to be made on the side of a mountain or hill, where the shooter has only space behind the bird—nothing, in fact, to assist him either in judging distance or pace. And it requires good judgment to determine at a moment that the gun must be so brought to the shoulder as to be slightly under the bird, if going straight away down hill (*see Ill. No. 38, opposite*) ; or, if to the right or left, slightly in advance—which tends to make the shot more difficult. At the same time, if good clean kills are obtained, nothing looks prettier, or establishes the reputation of the shooter as being a really first-class shot.





THE SNAP SHOT.

Snap shots have frequently to be taken at snipe, woodcock, and ground game; and to be able to kill well, it is very essential that the gun should fit well, and mount at once to the shoulder for correct alignment. A snap shot can more easily be taken by leaning well forward, so that there is nothing to prevent the gun being brought well up to its place instantaneously—(see *Ill.* No. 39, opposite). A man who looks along his gun can never be as good a snap shot as the one who shoots entirely with his eyes fixed on the object he desires to kill. A snap shot may often cause a miss; but what can make up for the delight of a kill when snapping at a woodcock? Nothing in my humble estimation.

SHOOTING HARES.

Hares are gradually becoming extinct; and in the face of the possibility of offending some of my readers, I must frankly say that I think hares should never be shot at in some districts, but should be left for those who prefer the sport of hunting and coursing. However, no doubt some of my readers would like to know what to do, in the event of their wishing to shoot them.

Hares travel at a great pace, and, although a large mark, they are very often missed—or rather wounded—and get away to die in a ditch or covert.

To kill a hare clean and well, if running away, the gun should be held well over it (*see Ill. No. 40, opposite*), so as to prevent hitting it in the hind quarters only. .





If coming towards the "gun" the aim should be well in front (*see Ill. No. 41, opposite*), and if running across to left or right, the aim or gun must be taken well in advance—sometimes as much as 6 ft.—especially if it has a clear run up a drain or furrow.

A hare should never be shot at at a greater distance than 35 to 40 yards, especially if going straight away.

Hares lie out in wheat, stubbles, fallows, clover and grass lands; and if you find them in their form, give them time to get a fair distance before firing, as you are more likely to kill, and less likely to damage, than by shooting at such close quarters.

Where hares are likely to be found, the shooter should be very quiet; because they are very shy, and often steal off and away at the sound of the voice or the closing of a gate.

SHOOTING RABBITS.

This is always good fun, and splendid practice for the beginner, because it teaches him to keep a good look-out, and handle or mount a gun quickly.

Rabbits, as a rule, only give time for a short sight of them. When bolting across a ride, always bear in mind to shoot where they are running to, and not where they are when you first see them (*see Ill. No. 42, oppsite*).

Rabbit shooting in rough grass land, or in fern or furze, is capital sport, if with the assistance of beaters. A perfect line with the guns should be kept, so as to allow of the shooting to be made either forward, or at one that may break back and get through the line.

A good hedgerow will sometimes hold a great number of rabbits; and a spaniel or terrier working them, with a gun on either side of the hedge, is good sport at certain seasons—December and January for choice. Great care must be exercised in this sport, so as to avoid shooting or wounding the dogs, or perhaps your friend. Remember, as a golden rule, never to shoot at a rabbit on the top of a hedge bank, and on no



Not where he is, but where he is bolting to.



account be led into shooting into or through a hedge, but let the rabbit be clear and going forward, or back along the outer edge of the ditch, well out in the field. Keep whistling to the "gun" with you, so that you may be opposite each other; and never shoot at a pheasant or any other bird that may be put up, if it is crossing to your friend's side of the hedge, but let him shoot when the object has got over and clear; simply call to him that something is crossing to his side, so that he may be ready for it.

Rabbits are generally found lying out in tufts of grass in fine weather, and, when started, are certain to make for the hedge or covert (*see Ill. No. 43, opposite*). To make sure of killing them, get well ahead, and shoot at the first chance, because a second is seldom given.

Rabbits are sometimes killed with small-bore rifles, built for the purpose; but, although this may be good amusement, it is not nearly such profitable practice for the beginner as shooting them with a gun.

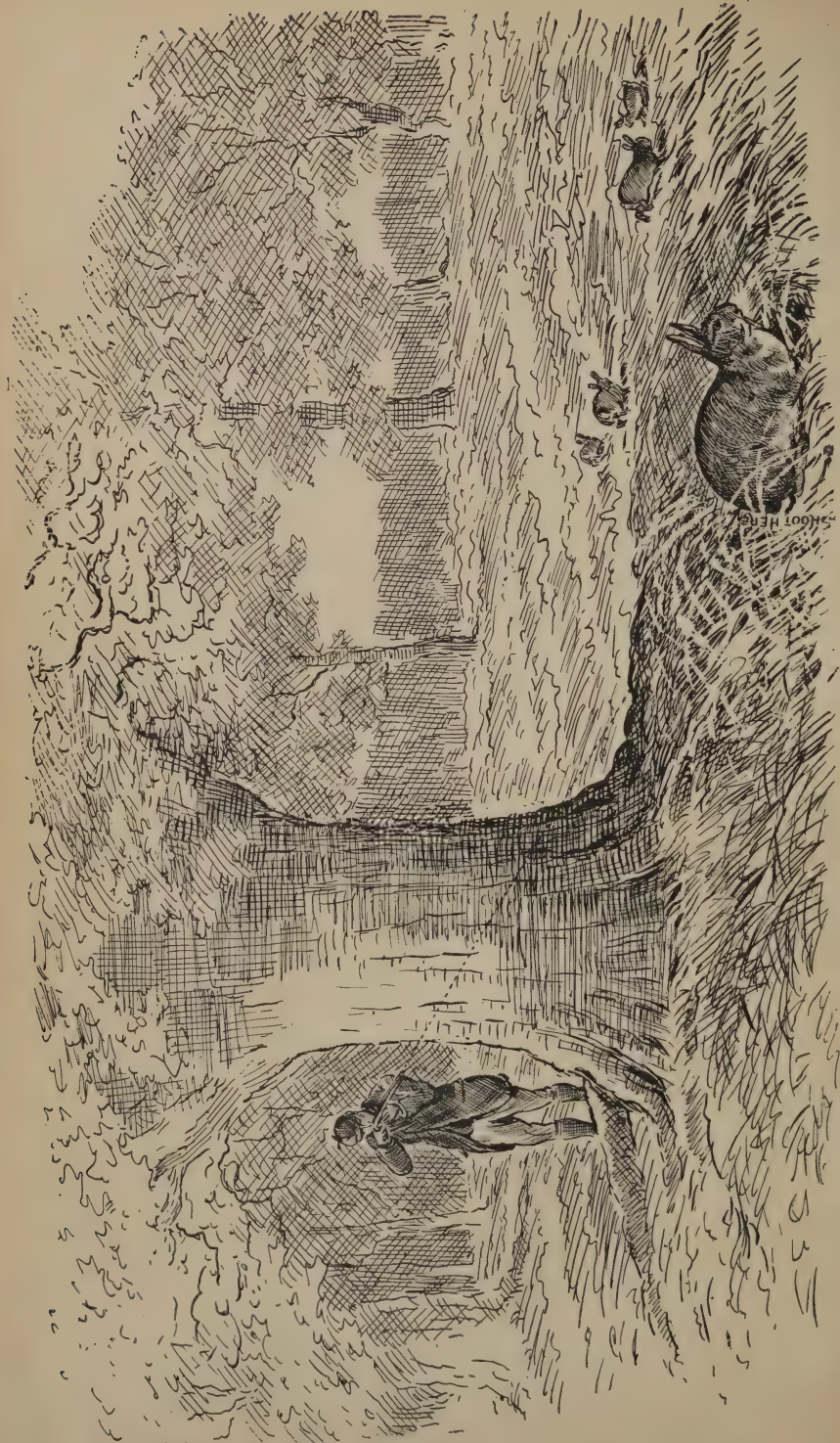
THE "POT" OR SITTING SHOT.

How annoying it is to shoot at an object, such as a crouching wounded bird or a sitting rabbit, that will not move—thus necessitating a "pot" shot—and to find that, even after a considerable amount of preparation, the object fired at has not been touched at all, perhaps even after a second barrel has been discharged.

I have frequently heard the remark, "Oh! you shoot it, So-and-so; I can't hit anything sitting. Make it run or move, and I'm your man." Why is this? Surely it cannot be difficult to shoot at an object perfectly still.

I think the reason is this: Very few sportsmen have so studied the question as to know that all shot travels curvilinearly. They are ignorant of the exact point-blank range of their gun; and they are not aware that with large shot, such as No. 5, the trajectory curve is flatter than with smaller shot, such as No. 7, and that, consequently, if they kill with one aim, with shot of one size, a different aim must be taken for the other. Yet these are facts, not surmises, and have been proved by actual experiment.





Therefore, at or inside the point-blank range of the gun, and with one known load, by shooting just at the angle formed at the point when the sportsman can see the ground and the object on it (*see Ill. No. 45, opposite*), a kill is a certainty; whereas at a longer distance the gun must be held above the point of the first aim—sometimes quite over the object to be struck—the shape of the ground being noticed, as to whether the shooting is on the level, or up or down hill.

It is useful to make this experiment on a road or path where the shot-marks are clearly visible, by shooting at a turnip, root, or even old tennis ball.

We can thus understand why, with modern Express Rifles, with flat trajectory, more kills are scored than with the old-fashioned ones, where the trajectory, or curve, was very great—thereby causing the bullet to go over or under, according to the point-blank range and the error in sighting or judging of distance by the shooter.

MISSING.

A chief cause of missing birds on the wing is the fault of shooting below the object aimed at—the gun not being kept up enough. You must aim above straightforward shots (unless a gun is very straight or too long in the stock), and well ahead or in advance of crossing ones (*see Ill. No. 30, page 67*). There is little fear of shooting too high, or too far in front, if the gun is well brought up to the shoulder; the aim is always too low and too point-blank at first. A sportsman frequently kills much better with his second barrel than with his first, because he instinctively swings his gun further ahead, or raises it over the object to be shot; and also because the hand or trigger-finger obeys the eye quicker, without that perceptible pause which is so fatal to all good shooting. In drawing or pulling the trigger, care should be taken to do it entirely with the finger, and not with any motion of the hand; or the tendency will be to pull off, in some cases to the right, but often to the left, owing to the gun being pulled across by the extra leverage of the left arm and hand.

When you miss, try and think why you miss; and if you steadfastly keep both eyes open, it will assist you in finding out the cause. If you cannot ascertain the reason, owing to the flinching or closing of the eyes from the noise the report of the gun gives, put an exploded cartridge into the gun, cover the next bird carefully, then swing the gun and pull the trigger instantaneously. This will enable you to see whether the fault was owing to the gun not being exactly where you wished it at the moment of pulling the trigger. Try this several times in the field, and it will help you considerably. If shooting in company, walk or stand close to one of the party, and make the experiment.

This test may be made quietly and by oneself at larks, blackbirds, and even sparrows, without much trouble or fear of disturbing game, as plenty of these birds may be found; but be careful not to mount the gun at them too soon. Be deliberate, and wait until they have reached a fair range; this will greatly assist in lessening that flush or snap shooting which is so difficult for young sportsmen to overcome. I mean that uncomfortable surprised feeling which puts one off when partridges rise with a whirr, but which never

troubles or interferes with a good steady old sportsman, who gives his game plenty of grace, at the same time is pretty certain of getting a right-and-left out of most rises.

Never fire at a bird too near; because, if a kill is made, the game is so dreadfully mangled as not to be worth picking up. And never shoot at too long a range, as the tendency is to wound; and a bird so struck is seldom recovered, but gets away to die a lingering death. Such shooting is most unsportsman-like and cruel.

A WORD OF ADVICE FOR ALL.

Always look upon a gun as a death-dealing weapon. Therefore, at all times be careful in which direction it is pointed, so as to avoid any possibility of its being in line or "laid on" to anybody or any animal whose life you would not like to take (*see Ill. No. 17, page 44*).

Accidents easily happen ; therefore, whether loaded or unloaded, always exercise the greatest amount of caution in the handling of gun, rifle, pistol or revolver,

If the above simple words are remembered, there can be no excuse whatever in the mere saying "I was not aware it was loaded," after mischief has been done.

I once read the last words of a suicide, in which he stated he hoped the jury would not return a verdict of "accidental death" or "death by misadventure," because he thoroughly understood what he was doing at the time he shot himself, and did not wish it handed down to posterity that he belonged to the class of idiots who inadvertently handle a weapon at a risk to themselves or others.

PART II.

The previous pages of this work treat of the practical part of the Art of Shooting, so far as regards the means which the sportsman should adopt, under the varying conditions of the bird's flight, to use his gun with effect. Now it is proposed to devote some further space to remarks on the gun and its accessories, and matters of a more or less theoretical character; and one of the first among the subjects to be taken into consideration will be that of

CLOTHES.

In looking round at those about to join in a day's shooting, it does not take long for the practised eye to detect which are the sportsmen and which are the tailor's models. It is simply astonishing at times to imagine where some of the materials, with their rainbow colours and mixtures, are designed and made.

Clothing should be so chosen as to resemble, as much as possible, in tone and colour, the surroundings where the shooting or sport is to be had.

Clothes should be cut so as to fit well, but at the same time permit of the sportsman being able to handle his gun freely in almost any position, and not to impede his movements. Badly-cut clothes, too tight across the back or in the sleeves, often prevent a man shooting well.

The softer the material the better; and a well-cut Norfolk jacket, and loosely-cut breeches or knickerbockers, with warm underclothing, are the best for sport generally. Good boots, in which the feet are perfectly comfortable, are most essential; as I defy any man to shoot well or enjoy his day, if his feet are galled or blistered. Never start a walk on the hills or fields in new boots—it has been done very often, but usually with most saddening results.

A warm light cape or cloak is a very useful adjunct to the sportsman's outfit (*see Ills.* Nos. 46 and 47). One that is easily rolled up and carried in a sling at the back, or by an attendant, forms a comfortable wrap in bad weather, or a seat, or cushion to kneel on in the event of a rest being required; and is as much protection as an extra coat in a long drive home.





A close-fitting cap should be worn, with peaks at the back and front to protect the eyes and throw off the wet. Care should be taken in selecting the colour, as the covering of the head is seen first by birds in driving; and, if too conspicuous, it will turn them from you.

GUN CLEANING.

I always make a point of seeing after the cleaning of my own guns when away shooting, and I find the following the best plan :—

Never attempt to clean your gun over-night, if the time is too short to do it properly, because often one is tempted to leave it after giving it only a temporary clean; whereas, if left till the next morning, it receives thorough attention.

I find the best way to remove all leading, fouling, and general dirt after a day's shooting is the following: Screw the jag on to the cleaning rod, and then wrap just as much dry tow or clean rag on it as will enter the barrel fairly tight. Do not put any oil at all this time, as the absence of oil enables the dry tow or rag to grip the dirt well, and removes it very quickly if the rod is passed from breech to muzzle briskly a few times. After doing this, look through the barrel to see if clean; if not, continue the operation a little longer, and if necessary increase the amount of tow or rag to make it fit the barrel tighter; then take some clean tow or rag, and apply a mixture of vaseline and sperm oil—or either alone

will do—and again pass the rod up and down the barrel quickly once or twice; then, for the last time, put a little more oil on the rag, and pass it through to the muzzle, and back, slowly, so as to deposit as much of the oil as will remain. The gun should always be looked at two or three days after it has been shot with, to see that no dirt has been left.

In wiping out the barrels, the muzzles should never be placed on a stone or concrete floor, but on a soft piece of wood.

On no account use a wire brush for the barrels, as such brushes do more harm than good.

If the gun has been out in the wet or snow, it should be well wiped over with a soft rag the same evening, and not be allowed to remain till the morning.

It is best to send the gun to its maker, or to some practical maker, before the season commences, to see if all is in order. If this were done more frequently, much inconvenience and annoyance would be saved to the shooter.

The strikers should frequently be taken out, wiped clean and dry, a little vaseline applied, and then re-

placed; a dirty clogged-up striker often retards the ignition of the charge, and sometimes causes a misfire.

The great fault is the putting of too much oil on a gun, so that it often gets gummy, or clogs the working of a gun, more especially "hammerless" and "ejectors." Vaseline, well worked on and into a soft piece of rag or an old pocket-handkerchief, is the best thing for cleaning all the outside parts of a gun, such as outsides of barrels (after the insides have been carefully wiped out), lock-plates, breech-action, triggers and guard, and other parts of metal that are exposed. *Never* allow oil to be applied by a feather, or any brush that is likely to do so too liberally.

Should the locks or any other of the interior working parts become dry, the smallest quantity possible of watchmakers' or any other highly-refined oil may be applied with a needle dipped in it—care being taken to wipe off any that appears superfluous; this will prevent the parts so treated from becoming sticky or clogged.

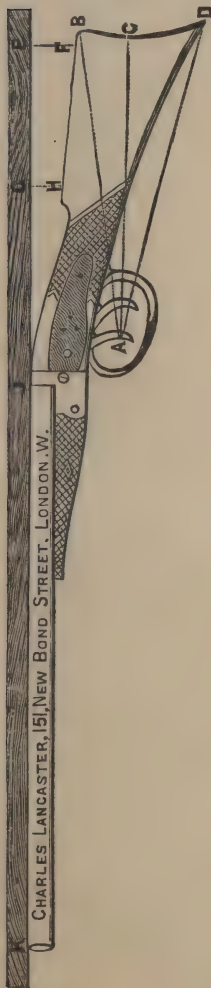
MEASURING A GUN.

This method has been used by many authors, but the best and simplest description I have seen is that in "The Dead Shot," so I copy the wording:—"Take a shoulder gun as near your fit as you can, and fasten tightly with twine a perfectly straight spline of wood, edgewise, along the groove of the rib which divides the barrels, leaving the breech end of the spline projecting over, and just beyond the heel of the gun-stock, as shown in the illustration; then lay the gun upon a table and measure with careful precision to the 16th of an inch as follows:—

For the bend of stock—from G to H, and from E to F.

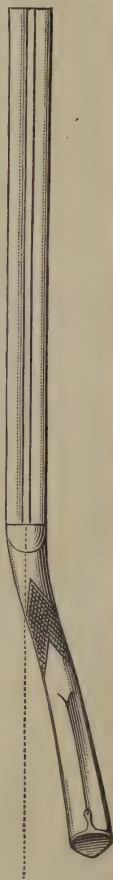
For the length of stock—from A to B, A to C, A to D.

The three latter measurements being taken from the fore-trigger to the edge of the heel of the gun-stock."



The amount of “cast-off”—*i.e.*, the set of the stock towards the shoulder, so as to get the perfect alignment along the rib of the barrels required by each individual, whether using the right or left eye—is very essential. Much correspondence has taken place in the *Field*, etc., on this subject; but I consider the best method, and one I have carried out for some years, is so clearly put by that well-known Sportsman “One who has Fired some 20,000 Trial Shots at Marks,” in his letter which appeared in the *Field* of Jan. 5th, 1889, that I reproduce the same:—

SIR,—A great deal has lately appeared in your columns on this subject, and doubtless where the sportsman is not sufficiently up, practically, in the gun to determine this for himself, it is about the most difficult point the gun-maker has to deal with. I may here mention a plan which, under certain conditions, never fails, and was that by which I determined the amount of crook I required when I had to use cross-eyed guns, when my right eye first failed me. The conditions are where a man shuts one eye and squints down the barrel, or where he has but one eye and the other is so weak that one does all the work in shooting. Shut a piece of thin writing paper into the breech of a gun so as to stand up about half-an-inch, then



proceed to cut an extremely narrow V just over the exact centre of the break-off. If, on throwing the gun up, the shooter finds this narrow V occupied by the sight on the muzzle, all is right; if not, by carefully raising the head without laterally shifting its position, it will easily be seen on which side of the V the sight comes; then cut away the paper on that side until the sight just shows itself on pitching the gun to the shoulder. This distance being added to or deducted from the cast-off already in the gunstock, the exact cast-off required will be found. I have not the smallest doubt that if many men who are in the habit of missing systematically would try this experiment, the reason of their doing so would become apparent.

ONE WHO HAS FIRED SOME 20,000 TRIAL SHOTS
AT MARKS.

Brighton; Jan. 2.

The Author has a measuring gun specially designed, so as to get, in a moment, the exact amount of cast-off required by any sportsman.

At the same time it may be advisable to state, in addition, the height of the shooter; and if he possesses any peculiarities of figure—as short neck or long neck, slender figure or very stout—they should be mentioned.

The length of barrels required should also be indicated, and if the boring is to be Cylinder or “Non-Choke” for both, or Modified or Full Choke.

CAST-OFF.

During a long correspondence on this subject, I published the following letter in the *Field* of the 17th November, 1888 :—

SIR,—In reply to your correspondent “Amateur,” cast-off should be given to all guns intended to be used from the right shoulder; cast-on for all guns to be used from the left shoulder. A gun-maker must make a study of this important feature in gun-making, or he can never make a perfect “fitter.” I maintain that unless a gun, to be used from right shoulder and right eye, is cast-off according to the figure of the gentleman one is building for (it may be only one-eighth of an inch, or it may be as much or more than five-eighths), and unless this cast-off is given, the gun will lie across the body—*i.e.*, point to the left and shoot to the left. So will it shoot to the left if the stock is so long that the gun mounts on the arm instead of the pectoral muscle. This may be corrected sometimes by laying the head over to the right; but that is a move after the gun has been put to the shoulder, and is fatal to good shooting.

To prove that my statements are correct, I ask you to come to my private shooting grounds and witness the shooting of guns with more or less cast-off at a target.

Only last week a gentleman brought me a gun, by another maker, with a cast-off of $1\frac{1}{2}$ inches (supposed to be enough for a left-eyed gun, whereas it would have required a cast-off between 3 inches and 4 inches). This

gentleman was really left-eyed, but, as he always closed that eye, he was in fact, right-eyed when putting a gun to his shoulder; and, to demonstrate how perfectly wrong his gun was stocked, by shooting quickly at a plate, he found he could not hit it at all, although it was 6 ft. by 4 ft., the centre of the pattern made by the gun being found about 5 ft. to the right of the point he was looking at with his right eye, and expecting to cover and hit. I changed his gun to one with a cast-off of $\frac{1}{4}$ -inch, and he covered the point he shot at every time.

Now, I ask, what chance had he of hitting anything at all in a day's shooting, except, perhaps, by "shooting at the cock and killing the crow?" Yet this gun was made for him by a maker who had taken a lot of pains to measure his customer for it. Is it to be wondered at that your correspondents write that "gun-makers do not know as much as they claim to?"

If any gentlemen wish to test the accuracy of my statements, if they will pay me a visit I will let them handle my specially designed gun for measuring, and will show them in a few minutes the effect of "cast-off" and "cast-on" in alignment.

CHARLES LANCASTER.

151, New Bond Street, W.

I have seen this in many cases, and those to whom I have explained it have seen it very clearly, and, at my special suggestion, have either shot with the left eye closed, before putting the gun to the shoulder, or else have allowed me to make them a cross-eyed gun—in other words, a gun built to fit the right shoulder,

but cast off sufficiently to allow the rib of the barrels to come opposite to the left eye for the alignment; and I am pleased to say that, after a little trouble and practice, they have found their shooting vastly improved, much to the astonishment of their friends and themselves.

I am convinced in my own mind, from the most careful noting of this fact during my experience of coaching and fitting, that, from the peculiarity of vision indicated, a man may unconsciously be most dangerous at the covert side, because he often "shoots at the cock and kills the crow." Where covert is thick, with trees having smooth bark, such as beech, birch, &c., he may, as he thinks, be shooting between two trees, whereas his faulty sight causes him really to point the gun more to the left-hand one, whereby the shot is liable to *ricochet* from it to his next hand "gun," who may unfortunately receive some of the glancing pellets in his face, or perhaps lose an eye. The offender will all the while protest that such a result is impossible, because he shot at an object a good deal to the right of the tree, or *vice versa*, should he be a left-handed shot; but it is nevertheless a fact. If any one doubts the truth of this assertion, let him cover up or shut the right eye, keep the head fairly

erect, and take a snap shot at a mark on a white-washed wall, and see where the shot will go; or let him make the experiment when standing in front of a looking-glass, and he will find the muzzles of the barrels pointing all away to the left. In other words, he will find the left eye, and the bead on the barrels, aligned a long way to the left side of his face, as reflected accurately by the glass (*see Ill. No. 3*).

COST OF MANUFACTURE.

As no doubt many who read these pages are unaware what a really fine gun costs the London gun-maker to produce, the following extract from "Shooting," Badminton Library, may prove interesting:—

| | £ | s. | d. |
|---|---------------------|----|----|
| Price of barrels (rough) | 5 | 7 | 6 |
| Hammerless action, with locks, safeties, etc. | 14 | 0 | 0 |
| Rough wood for stock | 1 | 12 | 6 |
| Stocking and screwing... .. | 3 | 7 | 6 |
| Fore part, fastener, oval screws and small work | 0 | 16 | 0 |
| Set of furniture and heel-plate | 0 | 17 | 6 |
| Fine boring, shooting and regulating gun cartridges, etc. | 2 | 2 | 0 |
| Stripping | 1 | 15 | 0 |
| Smoothing barrels | 0 | 7 | 6 |
| Browning barrels, polishing and hardening, etc. | 1 | 2 | 6 |
| Engraving (say) | 2 | 10 | 0 |
| Rent, gas, &c., expenses to replace damaged work | 2 | 2 | 0 |
| | <hr/> £36 0 0 <hr/> | | |

The whole of Chapter V. in the same book, on prices of guns, is interesting, and demonstrates to the general reader that it is not a fact that the maker of really first-class guns is the "robber" some designate him, and that generally his profits are less than those made by the seller of cheap guns.

FOUR-BARRELLED GUNS.

The only one at present known is that manufactured by Charles Lancaster, 151, New Bond Street.

The earlier models were objected to owing to the "pull off" being dependent on a drawing or long pull of the trigger. In the later model the pulls are similar to those of an ordinary gun, consequently removing the cause for objection. Sir Ralph Payne Gallwey, Bart., having used one, grouse driving, writes as follows:—

"I used the four-barrelled gun the other day grouse driving. I consider it admirable both in theory and practice, and most useful as a third gun for packs coming over, as by its means four birds can then be shot without taking the gun from the shoulder. It can also, in such cases, be fired much faster than can two double barrels, however quickly the latter may be changed and loaded. As a second gun on moors, where only two guns are required, it would be especially convenient. I do not see why it should be thought any more unsportsmanlike to use a gun with four barrels for game, such as driven grouse flying past in hundreds, than to use a pair of guns with two barrels each. I was pleased to find the new gun similar to an ordinary one as to weight, handling, pull of triggers etc., and that it is, besides, so easy of manipulation."

N.B.—Rifles are made on the same model.

HAMMER OR HAMMERLESS GUNS.

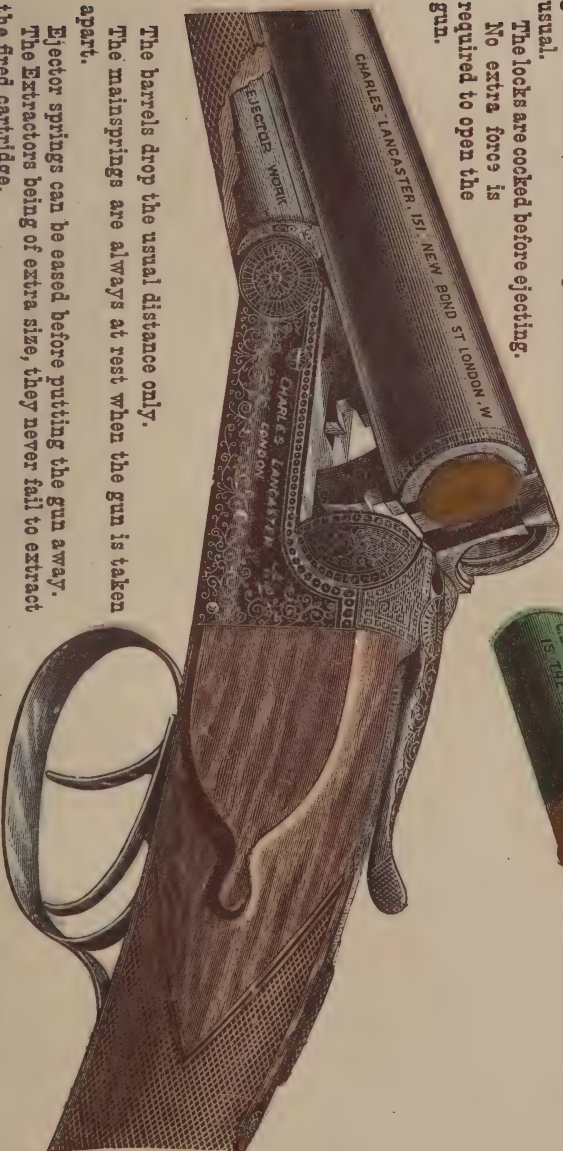
Hammerless guns are rapidly coming into favour with the generality of sportsmen, but a purchaser should insist upon having the blocking or intercepting safety bolts in his gun, as well as the usual locking safety bolt for the triggers. The automatic trigger safety bolt should be selected rather than the independent one, especially where two or more guns may be used,—the services of a loader being necessary. The automatic bolt effectually locks the triggers, and thereby prevents the accidental discharge of the gun from the loader carelessly touching or pulling the trigger when handling or unloading the gun. Those who have witnessed a heavy day's driving or covert shooting, where two or more guns are used, can well testify to the absolute necessity of this.

CHARLES LANCASTER'S BODY-ACTION HAMMERLESS EJECTOR GUN (PATENT).

The Ejectors are on fore end, perfectly independent of the lockwork, and do not alter the form of the gun. Should the gun not be fixed, the cartridges are extracted as usual.

The locks are cocked before ejecting.

No extra force is required to open the gun.



The barrels drop the usual distance only.

The mainsprings are always at rest when the gun is taken apart.

Ejector springs can be eased before putting the gun away.

The Extractors being of extra size, they never fail to extract the fired cartridge.

No tool of any sort required to cock the lockwork, so as to allow of the barrels being put into the action.

CARTRIDGE EJECTING GUNS,

WHICH EJECT ONLY THE FIRED CARTRIDGE.

(*See Ills.* Nos. 48 and 49).

These guns will eventually supersede all others, just as the magazine rifle will take the place of the single loading rifle, but at present they cannot be considered to have been absolutely free from failure.

The cartridges covered with brass are best adapted for these guns—especially those of Messrs. Eley's make—because in wet or damp weather they are less liable to be affected, consequently they give the ejectors less work to do than if the ordinary paper cartridges are used.

A MODERN GUN.

The following letter appeared in the *Field*, and still expresses my opinion :—

SIR,—Your correspondent X, in your issue of the 1st inst., asks for some ideas respecting a really serviceable game gun, as it might assist him and others to arrive at a conclusion, and thereby get what they want. I therefore beg to give him mine, and hope they will be of some service.

I say, first, that a sportsman should put himself into the hands of a thoroughly practical man, and find out what weight and bore of gun would be best suited to his special requirements; then be properly measured, so as to ensure the gun fitting him, as so much depends thereon.

I agree with him, that a pattern of, say, for the first barrel 140 to 150, and for the other 150 to 160—not a bunching pattern, but one that is fairly and evenly distributed over the usual 30 in. circle or more—would be best, if of 12-bore. A pattern that only covers about 20 in. very closely, and then leaves the remainder very patchy and irregular, is bad; as to shoot well with a gun that shows a close centre, a man must be a better performer than the average shot.

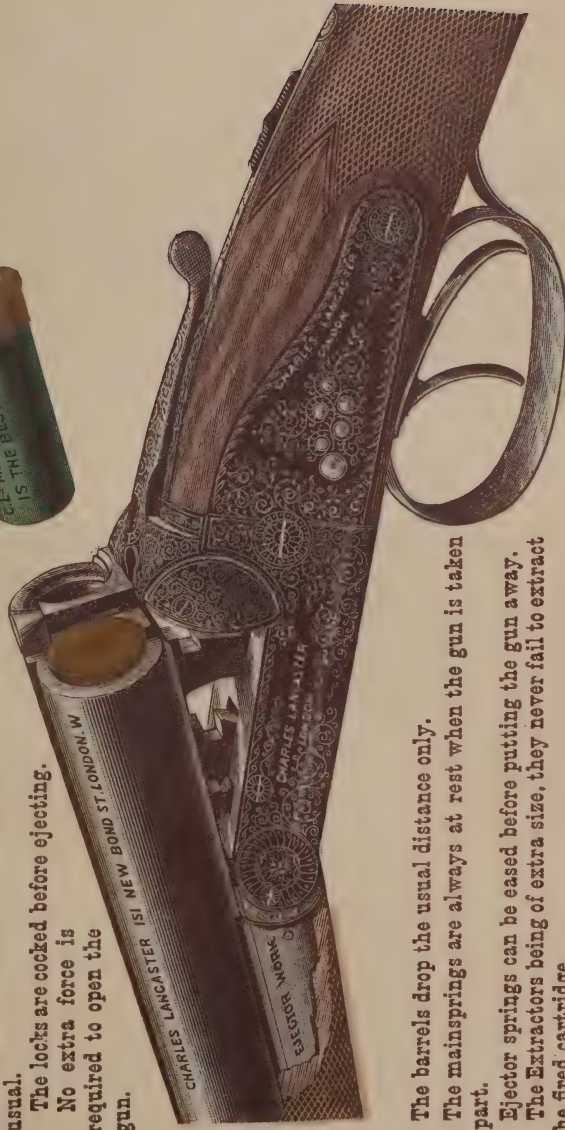
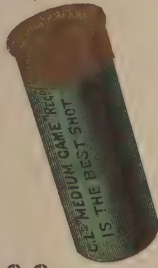
Cartridges should be loaded with the best materials, and I consider it a decided advantage always to use one uniform load, so that one's judgment is not liable to be handicapped owing to being upset by an unknown quantity in the shooting of irregularly performing cartridges.

CHARLES LANCASTER'S SIDE-LOCK HAMMERLESS EJECTOR GUN (PATENT).

The Ejectors are on fore end, perfectly independent of the lockwork, and do not alter the form of the gun. Should the gun not be fixed, the cartridges are extracted as usual.

The locks are cocked before ejecting.

No extra force is required to open the gun.



The barrels drop the usual distance only.

The mainsprings are always at rest when the gun is taken apart.

Ejector springs can be eased before putting the gun away.

The Extractors being of extra size, they never fail to extract the fired cartridge.

No tool of any sort required to cock the lockwork, so as to allow of the barrels being put into the action.

If a pair of guns are required, and likely to be used very much together, then I say let all four barrels be bored to give the same pattern and penetration; and, what is of considerable importance, let all four triggers have the same pull-off, and I find 4 lb. the best for all kinds of shooting (of course, many can, and do, have lighter pulls; but I am speaking of shooting with a pair of guns). If choke-bores are required, then have an extra pair of barrels fitted for the purpose, although much long-distance shooting may be made with the patterns I have named—I do not mean outrageous distances, but sporting distances.

A gun to give a pattern of 140 need not be “choke” bored, but, as your correspondent “Purple Heather” styles it, a “non-choke.”

I say by all means have your gun hammerless, but, before deciding, have the lockwork thoroughly explained to you, and see it worked (with a model, if possible) so as to be certain you are getting one in which an accidental discharge is absolutely impossible, *i.e.*, a gun that has proper blocking or intercepting bolts—a point on which the late Mr. Walsh had but one opinion. I have recommended many of my “pupils” to have hammerless guns, and, I believe, with every satisfaction to themselves.

The trigger safety may be automatic or independent—if for a pair of guns, where a loader’s services are required, by all means automatic. For one gun only, automatic is to be preferred, although many have the independent action.

Certainly choose a gun that has few parts, and see that those parts are strong and simple, so that any skilled mechanic might replace one, should it become damaged in a foreign country.

Have the gun with the top lever and snap action, but see that the lever is well underset to save its damaging the thumb if by any chance it should be touching in taking a snap shot, or else the thumbnail may be hurt.

A gun that is cocked by the fall of the barrels is easier to manipulate than one that cocks with the movement of either top, side, or under lever. Always have the best barrels, whether of steel or Damascus. I have shot a great deal this season with ejectors, and, providing they are arranged so as to be on the fore-end, and independent of the lockwork, I see no reason why they should not be used.

No doubt there are ejectors and ejectors, same as there were and are hammerless and hammerless guns; but because one fails, or requires re-regulating after a week or two's hard shooting in bad weather, it is no reason why they should not come into general use before many seasons are over, as, no doubt, they will be improved, when necessary, as time goes on.

Should an ejector be decided upon, the purchaser ought to satisfy himself that, if he should wish it to be removed, it can easily be done, and the gun then work the extraction of the cartridges in the usual manner. This should entail little or no expense afterwards.

The lighter the gun the more it will recoil, and, in some instances, "jump" unpleasantly, unless used with reduced loads. A well-balanced gun can always be handled with pleasure and quickness.

CHARLES LANCASTER.

151, New Bond Street, W.

STEEL OR DAMASCUS BARRELS.

I have read with much interest the many discussions that have taken place in the various sporting papers on this subject. I have written generally in favour of the best English Damascus barrels, which have been so long used, and have won the confidence of sportsmen, rather than advocated the use of "steel," its more modern rival.

Whitworth's Fluid Compressed Steel tubes are the best of all steel barrels; but I extract from the *Field* of the 20th October, 1888, the following opinion of Lord Walsingham, who has perhaps had a better opportunity than any living sportsman to thoroughly test the relative merits of both materials. It will prove of interest to many:—

LORD WALSHINGHAM'S BAG OF GROUSE.

Many of our readers having manifested some curiosity to know the guns and charges used by Lord Walsingham on August 30th last, when, as subsequently recorded in our columns, he killed 1070 driven grouse to his own gun; his lordship, in reply to our inquiry, has been good enough to supply the following information:

"On August 30th, when I killed 1070 grouse to my own gun, in the day, I shot with four breechloaders. No. 1, a

gun made in 1866 by Purdey, subsequently converted from pin-fire to central principle, to which new barrels were made last year. Nos. 2 and 3, a pair of central-fire breech-loaders, made also by Purdey, about 1870, for which I have likewise had new barrels. No. 4, a new gun made by Purdey this year, to match the two mentioned above, but with Whitworth steel instead of Damascus barrels. The guns are all 12-bore, with cylinder 30in. barrels, not choked. My cartridges were loaded by Johnson, of Swaffham; those used in the down-wind drives containing $3\frac{1}{8}$ drs. Hall's Field B. powder to $1\frac{1}{8}$ oz. No. 5 Derby shot; those used in the up-wind drives (where the birds of course came slower) had 3drs. only of the same powder, with the same shot; not hardened shot in either case.

"I find I never go out shooting without learning something. If I had the day again, I should cut off the extra eighth of an ounce of shot; not on account of recoil or discomfort of any kind—from which I never suffer, although always using black powder—but because I failed to get as much penetration at long distances as I do with an ounce only. I distinctly remember firing three barrels at one bird, striking well in the body every time, but killing dead only with the last shot; the powder seemed to burn too slow.

"Another thing I learnt was that Whitworth steel barrels are not desirable for a heavy day's shooting. The explosion in them makes quite a different sound from that given off by Damascus barrels; there is more ring about it, and I can imagine that this might prove a serious annoyance to anyone who minds the noise of shooting. I have no recollection myself of ever having had a headache from gun-firing. Moreover, the Whitworth barrels become hot much more rapidly than the Damascus; and this is a serious

drawback, especially to a man who shoots without gloves. I can well imagine that they last much longer, and are in many ways suited for ordinary light work; but I am now replacing them with Damascus, as in all my other guns."

“CHOKES,” “CYLINDERS,” OR
“NON-CHOKES.”

I just touch on this subject, not with the view of advocating the one or the other, but to show the difference between them. There is no doubt whatever that any gun-maker who may be consulted will be able not only to give the relative merits of each, but also to advise which is the more likely to suit the requirements of the shooter.

A “cylinder” barrel is a straight tube, of nearly the same diameter throughout, from end to end, but often relieved at muzzle and breech. The “choke” barrel is a tube, the front part of which is narrower or contracted at about half an inch from the muzzle. A mathematically true cylinder has hardly ever been sold. The “recess choke” is another form—the barrel being bored like a cylinder, and then a recess of from 2 to 4 inches is cut or spooned out from the forward portion of the barrel by the aid of a specially constructed boring tool. I have known some of my patrons who could not get on nearly as

well with a “choke” as they did with a “cylinder;” and having had the choke bored out, their shooting was improved.

The penetration of both the systems, as tested at the Pettit pads—a number (40) of sheets of stout brown paper fastened together—is nearly equal at all reasonable sporting distances. In the *Field* gun trial of 1878, when six cylinders and six choke bores were tried, 150 rounds were fired from each of the guns. The choke bores averaged a penetration of 25 sheets as against 23 sheets for cylinders. In each instance the sheets had to be penetrated by three pellets. This subject has been so often discussed, and trials made to settle the point, that it is needless to go further into it here; but the above fact is generally admitted to be correct.

CARTRIDGES.

The best cartridges should always be used, *i.e.*, those which contain the best powders and wadding, and which are carefully and accurately loaded. According to the quality of them so will be the results. By good cartridges a clean kill is obtained, and consequently more game is gathered; therefore it is a poor policy to buy cheaply and poorly loaded cartridges, to save perhaps a few shillings in the season, when by so doing the average kills are reduced, and the loss on the game is considerably greater.

The shooter who only fires a few shots a day should bear this well in mind, because he has often a long tramp between his shots, and can ill afford to find, after all his labour, that his gun is performing unevenly owing to the quality of his cartridges—or rather of their contents.

It is always an advantage to use the load recommended for the gun by its maker, and always to employ the same powder—whether “Black,” “Schultze,” “E.C.,” “J.B.,” or any other kind

that may be specially provided—because by the use of the same one's time is about equal, or, in other words, the velocity of the charge is not altered; consequently the judgment arrived at in aiming ahead of a bird is never beaten, and one's shooting is more regular.

I strongly recommend Eley's New Damp-proof Cases, which are of the same internal diameter as the usual paper ones, but have a coiled brass covering up to within $\frac{1}{4}$ -in. of the tube part, so as to be unaffected by damp, and yet admit of the cartridge being turned down in the ordinary way.

TIMES AND VELOCITIES.

The influence of time, in relation to accuracy of shooting at objects in motion, is deserving of greater attention than it ordinarily receives from sportsmen. Many among them seem to assume, if anything is said on the subject, that they are expected to cram their heads with a mass of figures, and make a mathematical calculation while birds are flying in front of them. They might as well assume that you cannot utilize "Bradshaw," to find the times of trains, unless you learn the tables by heart. Of course, it is possible both to travel and to shoot without paying any regard to time; but those who do so may not improbably incur indirectly much more trouble than they need have taken directly to attain the same end. The traveller may have missed many a train, and the shooter have missed many a bird, before fully learning the lesson that *Experientia docet*.

The tables which appear in the following pages are intended to illustrate general principles rather

than to furnish direct information respecting guns of any particular dimensions, or the charges to be used therein. It is for the reader to apply the general principles to his own particular case; for no number of velocity tables, and no amount of verbal explanation, will serve as a substitute for personal judgment, or give anyone an idea of the pace of birds which are flying before him. In such matters, knowledge must necessarily be based upon practice, which alone can enable a man to apply general principles to the best advantage; and he who is a clever shot must make effective application of such principles, even though he may do so unknowingly, and as the result of continued observation, and repeated application of the means to the end.

The first table here given contains some chronograph records of velocities obtained with different charges of powder and shot—the powder increasing by half-drachms, and the shot by eighths of an ounce; and each record represents the average of several rounds. Two kinds of black powder (both No. 4 grain) were used, viz., Curtis & Harvey's, and Pigou & Wilks's, and one nitro-compound, viz.,

Schultze powder. The records of C. & H. and Schultze are taken from the results of experiments made by Mr. R. W. S. Griffith, and published in the *Field* of July 26, 1879; and those with P. & W. powder are taken from a paper read by Mr. J. Rigby, before the Royal Dublin Society, and published in the Society's Transactions for 1883. Where a blank occurs in either of the columns of the following table, it indicates that the charge in question was not used in that set of experiments. In those carried out by Mr. Griffith, the same gun (a 12-bore) was used for both C. & H. and Schultze powder; in Mr. Rigby's experiments, a 12-bore and a 20-bore were used, and where the record quoted was made by the 20-bore an asterisk (*) is appended. In one instance two numbers are bracketed together, the same charge having been used in both bores, and the asterisk will serve to distinguish the one from the other.

VELOCITIES OF SHOT, TAKEN BY CHRONOGRAPH.

| | C. & H. No. 4. | Schultze. — | P. & W. No. 4. |
|-----------------------------------|-------------------|----------------|---------------------|
| 2½ drs. Powder. | Ft.-sec. | Ft.-sec. | Ft.-sec. |
| With $\frac{7}{8}$ oz. No. 6 shot | 816 | 813 | 828* |
| „ 1 oz. „ „ | 759 | 781 | { 812 768* |
| „ 1½ oz. „ „ | — | — | 750 |

| | C. & H. No. 4. | Schultze. — | P. & W. No. 4. |
|---|-------------------|----------------|-------------------|
| 3 drs. Powder. | Ft.-sec. | Ft.-sec. | Ft.-sec. |
| With $\frac{7}{8}$ oz. No. 6 shot | 883 | 877 | — |
| „ 1 oz. „ „ | 860 | 858 | — |
| „ $1\frac{1}{8}$ oz. „ „ | 827 | 848 | 834 |

| $3\frac{1}{2}$ drs. Powder. | | | |
|---|-----------|-----------|-----|
| With $\frac{7}{8}$ oz. No. 6 shot | 880 | 913 | — |
| „ 1 oz. „ „ | 900 | 905 | 850 |
| „ $1\frac{1}{8}$ oz. „ „ | 909 | 915 | 861 |
| „ $1\frac{1}{4}$ oz. „ „ | 852 | 863 | — |

Considering that these records represent trials made with different powders, the results come very close together, as a rule, when equal charges were used, although not all fired from one gun, nor tried under exactly the same conditions. It will be observed, however, that the powder which gives the highest results with one charge, does not necessarily retain its advantage when the charge is altered; for it not unfrequently happens, when different powders are tried in the same gun, that uniformity of effect does not follow an equal increase or decrease in the charge, either of powder or shot; and in like manner, the same cartridges will not shoot equally well in different guns. Generally speaking, however, it may be expected that an addition to the powder will increase the velocity of the shot; and, conversely,

with equal charges of powder, that an increase in the weight of shot will have the effect of reducing its speed. Nevertheless, this will not hold good in all cases, for the powder may be in excess of what will produce the best results, as will be seen by reference to the above table. On looking at the first two divisions ($2\frac{1}{2}$ drs. and 3 drs.), it will be observed that each increase in the shot charge was attended by a reduction in velocity, in accordance with the general principle mentioned above; but that in the third division, where the powder charge was raised to $3\frac{1}{2}$ drs., a different effect was produced; for the highest velocity was not obtained until the weight of shot was increased to $1\frac{1}{8}$ oz.; and beyond that point the general principle again came into operation. The fact appears to be that, when the powder charge is inordinately large, the superfluous energy is expended in scattering the shot, instead of driving it steadily forward; and the scattered pellets thereupon encounter greater resistance from the atmosphere, and accordingly lose more speed than they otherwise would do; whereas an addition to the weight of the shot produces a steadying effect, and, by keeping the charge together, tends to maintain a higher average velocity. That an excess of

powder does produce a scattering of the charge is frequently demonstrated by the smaller number of pellets placed upon the target when the charge of shot remains the same but the powder is increased. In the above-mentioned experiments, when 1 oz. of shot was fired with $2\frac{1}{2}$ drs. of C. & H. powder, the pattern in a 30-inch circle was 160; on increasing the powder to 3 drs., the pattern was reduced to 147; and when the charge was raised to $3\frac{1}{2}$ drs., the pattern fell to 123. And the loss of velocity has been demonstrated in other ways, besides the chronograph; for records on the force-gauge have been less with $3\frac{1}{2}$ drs. than with 3 drs., and there has likewise been a similar falling off in penetration with guns tried at brown paper pads. Effects of the same kind have also been produced when extra strong caps have been used instead of those of ordinary strength; but the effect is not the same on all kinds of powder.

The chronograph records given above represent not the velocity of the shot at its exit from the muzzle, nor that with which the pellets strike the target, but the mean velocity, or average speed for the entire distance of 40 yards; and, consequently, these velocities can be easily reconverted into times

by the simple process of dividing the length of range (120 feet) by the velocity in feet per second.

It would hardly be desirable, however, to adopt that course herewith the figures given in the foregoing table, as the variation in the charges would complicate the matter unnecessarily; and the general principle will be better demonstrated by having recourse to a single charge only, and showing how the times vary at different distances, and with shot of various sizes. The times here given are results obtained by Mr. Griffith, in experiments with Schultze powder, the charge being 42 grs. (equivalent to 3 drs. of black powder), with $1\frac{1}{8}$ oz. of shot. Four sizes of shot are here given, at ranges extending from 20 yards to 60 yards, and the variations of time were as follows:—

CHRONOGRAPH TIMES OF SHOT OF DIFFERENT SIZES.

| | No. 2 shot. | No. 4 shot. | No. 6 shot. | No. 8 shot. |
|---------------|-------------|-------------|-------------|-------------|
| Range. | Sec. | Sec. | Sec. | Sec. |
| 20 yards..... | ·0569 | ·0584 | ·0596 | ·0624 |
| 30 „ | ·0913 | ·0949 | ·0975 | ·1028 |
| 40 „ | ·1304 | ·1377 | ·1429 | ·1528 |
| 50 „ | ·1755 | ·1882 | ·1979 | ·2179 |
| 60 „ | ·2300 | ·2548 | ·2779 | ·3220 |

It will be observed that (the charge of powder being the same throughout) the time increases as the

shot lessens in size; and that the differences are much more marked in long ranges than in short ones. For example, in the 20 yards range, the time with No. 8 shot exceeds that of No. 2 by about 8 per cent.; but for ~~double~~ that distance, or 60 yards, the No. 8 pellets take 40 per cent. longer time in traversing the range than do those of No. 2 size. Consequently, in firing long shots, not only are large pellets more likely to kill the birds they hit, owing to their greater momentum, but less allowance is required to be made in shooting at the birds, because of the difference in the time. What distance would be traversed by a bird flying at the rate of 40 miles an hour, in the interval during which pellets are passing from the gun to the bird, will be seen by reference to the following table, which states the measurements near enough to mark the gradations of change, without resorting to minute fractions:

FLIGHT OF BIRD (AT 40 MILES PER HOUR) DURING
PASSAGE OF SHOT.

| Yards from Gun to Bird. | Sizes of Shot, and Distances flown by Bird. | | | |
|----------------------------|---|------------------------|------------------------|----------------------|
| | No. 2. | No. 4. | No. 6. | No. 8. |
| 20..... | $3\frac{1}{4}$ feet... | $3\frac{1}{2}$ feet... | $3\frac{1}{2}$ feet... | $3\frac{3}{4}$ feet. |
| 30..... | $5\frac{1}{4}$ „ ... | $5\frac{1}{2}$ „ ... | $5\frac{3}{4}$ „ ... | 6 „ |
| 40..... | $7\frac{1}{2}$ „ ... | 8 „ ... | $8\frac{1}{2}$ „ ... | 9 „ |
| 50..... | 10 „ ... | 11 „ ... | $11\frac{1}{2}$ „ ... | 13 „ |
| 60..... | $13\frac{1}{2}$ „ ... | 15 „ ... | 16 „ ... | 19 „ |

Among the points to be noticed here is the fact that, up to 30 yards, there is practically little difference between the various sizes of shot; for a few inches more or less are not of much importance with a charge of shot that has a spread of several feet. When, however, distances beyond 30 yards are traversed, the falling off in speed of the smaller pellets becomes considerable, and the farther they go the more they suffer; so that, at 60 yards, there are nearly as many feet of difference between the sizes of shot as there were inches of variation at half that range. Another thing is, that in firing at two birds, one twice as far off as the other, it does not suffice to make double the allowance; for, while the bird maintains its speed, the shot does not do so, and, except with the large sizes, it takes about three times as long for the pellets to go 60 yards, as it does to go half that distance. A corresponding increase of allowance should accordingly be made when firing at a bird that is far away.

Another consequence of difference of time is, that, under the influence of the force of gravity, the drop of shot, during its passage through the air, is much greater with small pellets than with large ones. This is not directly due to the difference of size or

weight, but to the loss of velocity, and to the consequently longer time taken in passing from the gun to the object fired at. And in this case the rate of increase differs from what was shown in the last table; for there the distance flown by the bird was in direct proportion to the increase of time taken by the shot; but the increase of drop is in proportion to the *square* of the time—so that, where the time is doubled, the drop is four times as great, and so on, as will be remarked on comparing the next table with the times stated in the last table but one. The measurements of drop are here stated to tenths of an inch, in order to avoid the apparent irregularity which would result from giving inches only.

DROP OF SHOT WITH PELLETS OF DIFFERENT SIZES.

| Range. | No. 2. | No. 4. | No. 6. | No. 8. |
|----------------|---------------|---------------|---------------|----------|
| 20 yards | 0·6 in. | 0·7 in. | 0·7 in. | 0·8 in. |
| 30 „ | 1·6 in. | 1·7 in. | 1·8 in. | 2·0 in. |
| 40 „ | 3·3 in. | 3·6 in. | 3·9 in. | 4·5 in. |
| 50 „ | 5·9 in. | 6·8 in. | 7·8 in. | 9·2 in. |
| 60 „ | 10·2 in. | 12·5 in. | 15·0 in. | 20·0 in. |

It will be seen that the drop with No. 8 shot, in 60 yards, is ten times as great as what it is in half that distance; and that, although there is little difference between No. 2 and No. 8 at 30 yards, the former has only about half the drop of the small

pellets at 60 yards. To counteract the drop of the shot, a certain amount of elevation is given to the barrels in the process of manufacture—the amount varying with the charge for which the gun is made, and the distance for which it is likely to be chiefly used. Occasionally one hears a man say that his gun shoots so hard that it is not necessary to raise it any more for 70 or 80 yards than it is for 40 yards. This is simply “bosh;” for if the shooter does not raise the gun himself, elevation must have been given to it by the gunmaker. It will be observed, on reference to the table, that the amount of drop is about doubled with every additional 10 yards (varying a little more or less according to the size of shot), and the amount of elevation that would suffice for a long range, would be excessive for a short one. Consequently, when a man kills at long and short ranges with the same elevation, there must be a certain amount of “fluking,” arising from the topmost pellets hitting at the long range, and the lowest pellets at the short distance.

Hitherto, all the examples that have here been given of the effect of time on the relative positions of shot and bird, have been affected by the variations in velocity of the pellets. But, besides these variable

times, there are two others that may be termed "constants,"—one personal, and dependent upon the shooter; the other mechanical, and dependent on the ignition of the powder, and the passage of the shot from breech to muzzle of the gun. In one sense, these "constants" are not constant; because one man may be longer than another in pulling the trigger, and one charge of shot may occupy more time than another in quitting the gun, owing to difference of powder, length of barrel, and so on. But, where the man, the gun, and the charge are the same, it may be assumed that the man will constantly take the same time to pull the trigger, and the shot will constantly take the same time to reach the muzzle, whether the bird is 20 yards off, or three times that distance.

These two "constants" have to be added to the figures previously given (page 142), showing the times of shot for various distances; and, as the flight of the bird is going on during the pulling of the trigger and the movement of the shot up the barrel, as well as during its passage from the gun to the game, it follows that these "constants" should not be overlooked in the allowance to be made when shooting at moving objects. But they do not affect

the drop of the shot, because gravity does not come into operation until after the shot has left the barrel.

It will doubtless be thought, by many persons, that these times are so trifling that they may be entirely left out of consideration; but, so far as the personal element is concerned, it is much more important than is generally supposed. If one man's nerve-system differs from another's, so that it takes a longer time for the sensation of sight to pass from the eye to the brain, and for the "order to pull" to be conveyed from the brain to the finger, those two men do not shoot on equal terms; and no alteration in build of gun, or the charge used therein, will enable the man of slower nerve-power to do what the other is able to effect. The slower man cannot get on his birds so promptly as his quick friend, and he must do his best to compensate for the lost time by greater allowance in advance of his birds. That this statement is not imaginary will be seen on reading an article by Dr. Fleming, hereafter given, on "The Physiology of Shooting," in which it is shown that some persons are six times as long as others in performing the same action.

Contrary to the other time illustrations that have been given, these "constants" have a comparatively

greater effect on the shooting at short ranges, because the addition to be made for 20 yards, where the velocity is high and the time short, is just as great as for 60 yards, where the velocity is much reduced and the time long. And the higher the speed of the bird, the more it tells against the slow man; and consequently it would be more difficult for such a person to make a good score with driven grouse, coming down wind with a strong breeze. Dr. Fleming shows that a man with quick nerve-action will pull the trigger in $\frac{1}{100}$ of a second, whereas another will take $\frac{6}{100}$ of a second to do so; and it has been shown, as the result of Mr. Griffith's experiments, that, from the pull to the trigger to the exit of the shot from the barrel, there is a period of about $\frac{1}{100}$ of a second, varying more or less with the nature of the powder and the charge used. On adding these items to the times previously given for $1\frac{1}{8}$ oz. of No. 6 shot, propelled by 3 drs. of powder, we may ascertain what would be the respective distances flown by birds during the intervals occupied by the shot in coming up from the gun of the quick-nerved man, as compared with him of slow nerves. Some persons say that birds, when flying down wind, will travel at the rate of 100 miles an hour. Without,

however, going to such extremes as that, let us assume velocities from 40 to 60 miles an hour, and distances from 20 to 40 yards, and see how far it would be requisite for two men, so differently endowed with quickness of nerve-power, to shoot in advance of birds in order to countervail their rate of progress. The words "Quick" and "Slow," in the following table, will indicate the two men, and the measurements under those words will show how far the birds would fly in the intervals between the instant when the respective men resolved to fire, and that at which the shot would reach the bird.

| Miles per hour. | 20 yards. | | 30 yards. | | 40 yards. | |
|--------------------|----------------|--------|------------------|-------|------------------|-------|
| | Quick. | Slow. | Quick. | Slow. | Quick. | Slow. |
| 40 | 4½ ft ... | 7½ ft. | 7 ft...10 ft. | | 9½ ft...12½ ft. | |
| 50 | 5¾ ,, ... | 9½ ,, | 8½ ,, ...12¼ ,, | | 12 ,, .. 15¾ ,, | |
| 60 | 7 ,, ...11½ ,, | | 10¼ ,, ...14¾ ,, | | 14¼ ,, ...18¾ ,, | |

Here it is shown that the slow-nerved man would have to allow a yard more than the quick one, when shooting at a bird flying at the rate of 40 miles an hour, no matter whether the bird be near or far off; and for every additional 10 miles of speed, about 1 foot more of allowance would be requisite. Be it observed, however, that these differences only apply to the extremes—the man who is quickest and the one who is slowest; but between these two, whose

“personal errors” are respectively indicated by $\frac{1}{100}$ and $\frac{6}{100}$, there are many others who would require an intermediate classification. These personal variations may account for many differences of result obtained by people who think they are exactly carrying out the instructions given them by their mentors; for it is to little purpose telling a man that, under certain circumstances, he should fire a yard in front of the bird, if the state of his nervous organisation is such that he ought to make double that allowance.

In concluding these observations, the remark may be repeated that they are only intended to set forth general principles, the application of which must depend upon the shooter himself. He will see that there is a great deal of difference between the time of different sizes of shot in long ranges, and that allowance must be made for such differences, if he would obtain the best results in all cases. He will see, too, that different persons vary as much as the shot, and such variations affect the shooting at all distances, long or short. But, unless a man gets his personal error found for him by an expert, he is not very likely to know its exact amount, and he can only try the results of experience by increasing his allowance in shooting before crossing birds. It not

unfrequently happens that men who shoot at the first bird of a covey, contrive to bring down the last. If feats of this kind recur with the same individual, it is probable that he is one whose "personal error" renders it desirable to make a more liberal allowance in front of his birds than he is in the habit of giving; and he may go on increasing such allowance until he makes up for the lost time. He is not very likely to proceed to the other extreme, and bring down the first bird in a covey when he fires at the last.

The following is Dr. Fleming's article previously alluded to. It is quoted from the *Field* of Feb. 19, 1887.

THE PHYSIOLOGY OF SHOOTING.

BY WM. JAS. FLEMING, M.D.

It is universally admitted that good shooting depends less upon the gun than upon the man behind it. The gun and all connected with it have received, and still receive, most minute and careful study, but little attention has been devoted to the human element in marksmanship. In so far as shooting goes, the man is as purely a machine as the gun, but a much more complicated and less understood piece of mechanism, and, to make the problem worse, an individual mechanism—no two quite alike. There are, however, some principles and arrangements common to

every human shooting machine which can be formulated, and in this paper I will try to place them as clearly as possible before my readers. For this purpose it will only be necessary to consider the problems connected with shooting at moving objects, as this embraces all the questions arising out of target practice.

To begin with, let us try to analyse the processes which result in a bird coming down a few yards from where it rose near a good shot. First, he sees the bird—that is to say, the image of the bird is sharply focussed on his retina by the proper adjustment of the internal mechanism of the eye. In this retina the picture thrown upon it sets up nervous changes, which are conveyed to some part of the brain, and there produce what we call vision—in reality, a change in some part of the nervous tissue of the brain. At the same time he judges the distance of the bird and the direction and rate of its flight by a complicated process, of which more hereafter. The information thus gained is transformed at first by an effort of will, but, after sufficient practice, automatically, into orders affecting nearly all the muscles of the body. He plants his feet firmly and raises his gun (for simplicity sake here we will suppose he is a shot who takes aim—a question afterwards to be discussed). Having raised the gun, he looks along it, and, I believe, by a continual alteration of the focus of his eye, sees both the sight and the bird at one time, and waits till they are in one line. Again this state of affairs is communicated to the brain by the eye, and an order sent to the finger to pull the trigger; then the mechanism is all gun. It is all done in the fraction of a second, but it must all be done, and really much more.

I must now endeavour to explain the above somewhat more fully, but will take it for granted that the reader

knows enough of ordinary optics to require no more detailed explanation of how the bird is seen, only remarking that it is by no means an instantaneous process.

Seeing the bird, how does he judge its distance from him? *By the summation of the various adjustments his eyes require to make to see clearly, compared with previous experience.* The principal of these adjustments are the amount of convergence of the two eyes required to bring their optical axes to a point at the bird, and the amount of accommodation necessary to bring the image of the bird to a sharp focus on the retina. These adjustments are made by muscles both without and within the eye, and we are informed of their amount by the *muscular sense*. This muscular sense is really the keynote of the whole question, and therefore requires some further explanation.

It is not generally known that we possess a distinct power of appreciating the amount of muscular force required to perform an action, quite separate from our sense of touch. Perhaps the best way to understand this is to consider the different effects of, say, a pound weight laid upon our palm with the back of the hand resting upon the table, and the same weight lifted freely up and down, as we instinctively do in estimating weight. In the first case we feel the pressure of a cold, hard body, but, if not aided by sight, have a very faint idea of its weight; indeed, we can scarcely tell the difference between one and two pounds if the surfaces touching the palm are of nearly the same area, and if the objects are gently deposited, the eyes being shut, and the hand motionless and supported. If, however, the weights are lifted by the arm, we at once appreciate the difference. This muscular sense plays a very important part in our lives, and is peculiarly capable of training. A good example of this is the power acquired

by letter-sorters in the post office to detect by the hand alone the slightest over-weight, a practised hand rarely erring. It is by this muscular sense, telling us how much we have required to use the muscles both within and without the eye, that we estimate distance.

To return to the bird, we have seen that a series of complicated processes are necessary merely to see it and judge approximately its distance; but, aided by experience, we learn by means of the same mechanism, and practically simultaneously, a great deal more about it—the angle in relation to our position at which it is flying, an idea of the pace it is going, &c. Having unconsciously, or at least apparently so, got all this information, which, of course, is largely due to practice, the brain condition thus set up induces (in what physiologists call an automatic manner) a large number of muscular actions—planting the feet, raising the gun, and in the case of the man who aims, which we are now considering, closing one eye and bringing the other to a place in relation to the gun suitable for aligning the barrel with the bird; then information is carried to the brain that the gun is “on,” and an order sent to the finger to pull the trigger. In the case of the man who shoots with both eyes open and the head erect—who, in fact does not look along the gun at all—we have a somewhat different order of proceeding. He estimates in the same way the distance, direction, and rapidity of flight; but having done this, trusts entirely to his muscular sense to hold the gun straight and to tell him when it is straight. To succeed in this can only be the result of practice; but we must remember that the muscular sense varies enormously in accuracy and rapidity of expression in different men, and even in the same man at different times and under different conditions. Some men hear, see,

taste, smell better than others; why should we wonder that they differ in this sense also, or that one individual requires more training or practice than another to achieve the same accuracy?

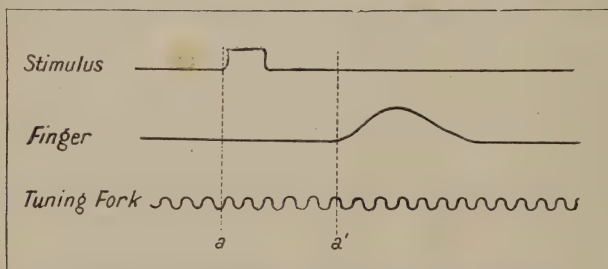
This difference between individuals is not confined to their muscular sense, but exists in an even more marked way in the amount of time required by each to go through the complicated nervous and muscular actions which I have described. Attention was first drawn to this by the astronomers, who found that it is necessary to allow for what is called "personal error," in the observations of different individuals. For instance, suppose it is required to observe the exact moment at which a star touches a hair stretched across the field of a stationary telescope, and that by a suitable arrangement two observers are enabled to watch through the telescope at the same time—it will be found that an appreciable difference exists in the record of each. What is more, this difference will be practically constant for the same individual, constituting his "personal equation," which has to be allowed for in subsequent calculations. By modifications of this idea, physiologists have succeeded in measuring, not only the time taken by the whole process, but the time occupied by each of its component parts.

To go into the details of these experiments is needless here, but, in order to give a general idea of the methods employed, it may be well to describe one or two of them. Let us take first the one which has been perhaps best worked out—the determination of the rapidity with which an impulse travels along a nerve. If we arrange a stimulus—most conveniently an electric shock—so that when applied, let us suppose over a nerve in the forearm, it causes a contraction of the muscles of a finger, and consequently a

movement of the finger, and if we measure the exact time which elapses between the electric shock and the movement of the finger, first when the stimulus is applied, say, nine inches from the finger, and again three inches from the finger, the difference will give us the time taken for transmission through the six inches, and therefore the rate.

Some of the readers of this article may be interested in the apparatus employed in making these delicate measurements, so I will briefly describe the essential features. We require a surface moving rapidly and regularly, upon which a faint motion can easily make a mark. This is generally obtained by a large cylinder rotated by clockwork, and covered with smoked paper. Upon this are inscribed, by light contact, motions, however slight, communicated to levers. For the experiment just mentioned, to determine the rapidity of transmission of nervous impulses, three of these levers would be required—one attached to the finger to be moved, one actuated by the same electric current which gives the shock, and one connected with a chronograph or instrument for marking time. This is generally a tuning fork, the number of whose vibrations is known, and of course constant. If, then, with the three levers adjusted to write exactly perpendicular to each other, the cylinder is rotated, we shall have three straight lines drawn. If, now, the tuning fork is made to vibrate, the lever attached to it will mark curves, and if, now, the electric shock is sent into the nerve, the lever connected with it will move and mark the exact moment of stimulation. As soon as the muscles of the finger begin to respond to the stimulus, the lever attached to the finger will mark, and the difference between the two, read by the vibrations of

the tuning fork, which have been going on all the time, gives the time of transmission. Our tracing then will be something like this, and the distance between the lines a and a' , read on the tuning fork the actual time of nervous



transmission, less the latent period of the muscle, which we need not consider in this case. By this experiment, more or less modified, it has been calculated that the rate of transmission of motor stimuli in man is only 120 feet per second. Your readers will remember that shot at 40 yards travels at the rate of about 600 feet per second.

To estimate the time taken by the whole process, for the conversion of a visual image into a voluntary muscular action—which is exactly what takes place between seeing a bird and pulling the trigger—a slightly different arrangement is required. The person to be experimented upon is seated with his finger on an electrical key, so arranged that the moment it is depressed, a mark is recorded upon the revolving cylinder. A blue and red light are fixed so that either can be shown at the option of the experimenter. The subject of the experiment is directed only to depress the key when one of those lights is shown, and the instant at which this light is exposed is also recorded upon the cylinder. A chronograph is used as before. By this means we are able to estimate the whole time taken by both the nervous transmission and

the mental judgment of which of the two lights was shown. The result of a number of experiments on these lines give for different individuals from $\frac{1}{100}$ of a second to $\frac{6}{100}$ of a second. Now, if we consider that this corresponds to the interval between the gunner seeing the bird and pulling the trigger, we can easily calculate that if the bird is crossing at the rate of 50 feet per second—practically thirty-four miles an hour—in the case of a man with $\frac{1}{100}$ of a second personal error, it will only have flown 6 inches, whereas, in the case of the man with $\frac{6}{100}$ it will have flown 3 feet. This seems largely to explain why men differ so much in the amount they borrow. The lesson is that each individual must find out the proper “borrow” for himself, as another person, with probably quite a different personal error, cannot guide him.

A great deal has been written lately in your columns on the two methods of borrowing, which I may summarise as “swing” and “carry forward.” Upon this also the above considerations may throw some light. By “swing” I understand keeping the gun moving with the object for a short time before firing. Your correspondents are not at one about this, it appears to me, because they do not consider what is taking place during the time between the determination to pull and the explosion of the powder. If during this interval the swing is arrested (as I fancy it often is), then the gun must be pointed considerably in front of the object; but if it is kept up, that is to say, if the gun is kept pointed at the object until the shot has left the barrel, a very small allowance is necessary—merely the time taken by the shot to reach the object. Indeed, the swing of the gun must to some extent do away even with this, in the same way that a heavy object thrown from a rapidly moving train does not fly at a right

angle to the train, but has the train's forward motion communicated to it as well as the motion of throwing, and therefore assumes the direction of the resultant of these two forces—outwards and forwards.

In what I have described as the carry-forward method of borrowing (which I conceive is less often actually employed than is supposed), the idea is to fire into the air where the bird will be when the shot reaches that place. Now, this may do for the man of very slight personal error, but for the man of great personal error seems to me impracticable, from the immense distance it would entail firing in front. A good many who think they practise this method probably swing the gun into a position in front of the object, stop the swing, and fire. By this it is obvious that they only need to allow for the time between deciding to fire and the shot reaching the place; but a man who fires where the bird will be without any swing, must allow for all the time of deciding how far forward to shoot, raising his gun to that, and then the time of firing and travel of shot.

I am sorry I cannot suggest any simple means by which sportsmen could ascertain the amount of their personal error, as the apparatus I have described is not easily attainable; but perhaps some of our enterprising gun-makers might find it pay them to have such an apparatus for the benefit of their customers. I shall be glad to advise as to such an installation. I have long been of opinion that very good shots are generally men with small personal error, and such an arrangement would enable the truth of this idea to be investigated.

Another important point in connection with this matter is the influence, noticed by all observers, which food, stimulants, and sedative, have in altering the figures for

each individual. The effects vary in different persons, and this goes far to account for some men shooting better before, others after, lunch, for some men being unable to shoot if they smoke, others unable to shoot if they do not. I have tried to show that each must be a law to himself, and therefore, I trust, helped some men who have failed to get good results by following the rules of their mentors.

VELOCITY OF THE FLIGHT OF BIRDS.

Very different opinions are often expressed as to the speed of game birds when in full flight; and no doubt much of the difference of opinion is due to the variations that arise from the amount of assistance derived from the wind. Some persons think that pigeons are faster than the generality of game birds, and others the reverse. There is much more information available with respect to pigeons than with regard to game birds, owing to the number of races which continually occur with homing pigeons; and the following letter from Mr. Tegetmeier, which appeared in the *Field* of January 22, 1887, gives some detailed information on the subject. It will be seen that in some of the races the speed of the birds was more than double what it was in others; but it must be remembered that pigeons make their way homewards, whether the winds be favourable or adverse; and consequently, in some of these instances the birds were greatly assisted by the wind, while in others they were retarded.

The question as to the rate at which birds fly is one which has recently attracted considerable attention, and very erroneous guesses have been hazarded. There is only one bird of which we have any authentic and reliable record of its rate of flight, namely, the homing pigeon.

In the races which take place in this country and on the Continent, the exact time at which the birds are liberated

is recorded, and the moment they reach their homes the number (previously unknown to the owner), which has been stamped on the flight feathers, is telegraphed by him to the secretary of the race, hence the returns are most reliable.

The velocities attained in the different races vary very greatly with the state of the weather, for, as the birds fly by sight, they are much hindered by mist or a dull atmosphere, and they are also greatly affected by the force and direction of the wind. The only fair mode of proceeding, therefore, is to take the average of a number of races, which would necessarily include those flown under divers conditions as to atmospheric influences.

The following table gives the result of the races flown by the United Counties Flying Club in the year 1883; the velocity in yards per minute of the fastest bird in each race is given, and in the following column the number of miles flown, and also the points of departure and arrival:

| No. | Velocity in Yards per minute. | Miles Flown. |
|-----|----------------------------------|--------------------------------|
| 1 | 1240 | 136—Swindon to Lowton. |
| 2 | 963 | 195—Salisbury to Barrowford. |
| 3 | 1620 | 208—Ventnor to Manchester. |
| 4 | 992 | 270—Cherbourg to Manchester. |
| 5 | 443 | 121—Ventnor to Worcester. |
| 6 | 732 | 201—Cherbourg to East Langton. |
| 7 | 935 | 269—Granville to Lullington. |
| 8 | 1145 | 309—Rennes to Church Langton |
| 9 | 898 | 144—Cherbourg to Cardiff. |
| 10 | 990 | 175—Granville to Devizes. |
| 11 | 1271 | 224—Rennes to Devizes. |
| 12 | 804 | 129—Cherbourg to Reading. |
| 13 | 916 | 168—Granville to Bexhill. |
| 14 | 1406 | 232—Rennes to Sunningdale. |
| 15 | 1293 | 87—Worcester to Audenshaw. |
| 16 | 1366 | 104—Winchester to Langdon. |
| 17 | 891 | 77—Cherbourg to Ryde. |
| 18 | 1162 | 140—Cherbourg to Norwood. |

Total...19,067

By adding the velocities in these races together, and then dividing by the number of races (18), we obtain an average velocity of 1059 yards per minute, which, omitting fractions, is equivalent to 36 miles an hour.

The fastest race chronicled in the above table is No. 3, from Ventnor to Manchester, in which a velocity of about fifty-five miles an hour was maintained for four hours in succession; but then the weather was clear, and wind favourable, being south-west.

The slowest race in the list was No. 5, in which the winning bird only accomplished 443 yards per minute; but this was so exceptionally slow a flight, that there must have been a disturbing cause, as many of the best birds in the kingdom competed: and from Granville (No. 7), three weeks after, the same birds more than doubled the rate of travelling, and a fortnight later some of them came from Rennes (No. 8) with nearly treble the speed of the race from Ventnor, although the distance was two and a half times greater.

When it is thus demonstrated that the average rate of speed of the fastest trained pigeons, *la crème de la crème*—the picked birds of thousands—is under forty miles an hour, and that even with a favourable wind it does not reach sixty, the crudity of the opinions often hazarded as to the rate of flight of game birds becomes evident.

It is much easier to gain a correct idea of the comparative speed of other birds with that of pigeons than to arrive at an independent conclusion from seeing them fly. When a partridge is in the air we cannot accurately gauge his rate of flight; but knowing that the average rate of flight of a pigeon is under forty miles an hour, we can make an approximation as to the speed of other birds.

W. B. TEGETMEIER.

With game birds few experiments have been made ; but the following article, from the *Field* of Feb. 19, 1887, gives particulars of some chronographic experiments carried out with partridges and pheasants as well as pigeons. In these instances the birds were neither aided nor retarded by the wind, as the day was perfectly calm. The difference between the best pigeons in these experiments, and the average of the races given above, was not very great ; and the pheasants were a trifle faster than the pigeons, especially in the open, while the partridges were not quite so fast.

EXPERIMENTS TO ASCERTAIN THE VELOCITY OF FLIGHT OF BIRDS.

The rate of speed attained by birds that are commonly shot by sportsmen has been the subject of a good deal of discussion in the *Field*, and very conflicting opinions have been expressed with respect to their powers of flight. In order, if possible, to obtain data of a more reliable character than many vague surmises which have been indulged in, we requested the assistance of Mr. Griffith, who has from time to time furnished our readers with so much valuable information relative to the velocities of shot and the explosive force of gunpowders ; and he not only very kindly complied with our request, but has improved upon the method we suggested for carrying out the experiments.

The series of trials was commenced with pigeons, which it was thought might probably be more amenable than wild game to the conditions connected with their flight,

and so, in the event of there being any hitch in the arrangements, there would be a better chance for the apparatus to be got into thorough working order before attempting experiments with partridges or pheasants. In order to secure a good standard of comparison, Mr. Hammond, the well-known purveyor of pigeons for the Hurlingham Club, was asked to select some of his very best "blue rocks" to pass through the ordeal. The experiments with these birds were carried out about two months ago, on a fine clear day in the middle of December, when there was no wind whatever to enhance or diminish the natural speed of the birds.

The pigeons commenced their flight at one end of the covered range, or experimental shooting gallery, of the Schultze Gunpowder Company, in the New Forest, and the birds thus had the opportunity of getting well on the wing before they reached the other extremity, where was placed the apparatus employed to record their rate of speed after they had flown 40 yards. Two "screens," or arrangements of fine threads, were here put into connection with the electric apparatus, and through these threads the birds must necessarily dash in their flight, in order to make their exit from the range. The so-called "screens" were composed of the finest invisible-grey cotton, so easily broken as not to check the flight of the birds in the slightest degree, and the successive breakages were instantaneously recorded by the electrical apparatus. Between the two screens there was an intervening space of 6ft. 9in. (a distance which was adopted from its being convenient for regulating the chronograph), and, the apparatus having recorded the time taken by the bird in traversing this $2\frac{1}{4}$ yards interval, the velocity was then readily convertible into yards per second or miles per hour.

In order that the birds might fly directly towards these screens, all apertures in the building were darkened except the open end of the range; and, as the birds, on being liberated, would naturally fly towards the broad daylight, and be likely to gain full confidence as they approached the place of exit, it was hoped that each of them might be led to do its best by the time it reached the point where the record of speed was to be made. The results, on the whole, were very satisfactory. Now and then a bird would not fly straight, or would check its flight before dashing through the screens; but, whenever such was the case, the record was rejected as defective, and accordingly does not figure in the list which is given below. The number of good flights, however, was sufficient to enable Mr. Griffith to make twelve fair records of speed, the particulars of which are as follows:

| PIGEONS IN THE 40 YARDS RANGE. | TIME. Sec. | RATE OF SPEED. | |
|--------------------------------------|---------------|----------------------|--------------------|
| | | Yards per Second. | Miles per Hour. |
| 1st | ·157 | 14·3 | 29·3 |
| 2nd | ·156 | 14·4 | 29·5 |
| 3rd | ·168 | 13·4 | 27·4 |
| 4th | ·150 | 15·0 | 30·7 |
| 5th | ·163 | 13·8 | 28·2 |
| 6th | ·139 | 16·2 | 33·1 |
| 7th | ·169 | 13·3 | 27·2 |
| 8th | ·153 | 14·7 | 30·1 |
| 9th | ·168 | 13·4 | 27·4 |
| 10th | ·176 | 12·8 | 26·1 |
| 11th | ·157 | 14·3 | 29·3 |
| 12th | ·136 | 16·5 | 33·8 |

Having obtained the above chronographic results in the covered range, Mr. Griffith was not content to let matters

end there, and he therefore determined to place these velocities in comparison with records of flight in the open. For this purpose he adopted a method very similar to that which has since been suggested by "Vivarii Custos" (*Field*, Jan. 15) as a means of ascertaining the flight of driven partridges. Mr Griffith placed men in ambush at various measured distances, with instructions to signal as soon as a bird arrived opposite either of the stations. When the bird had flown 25 yards from the starting point in the open, the time was taken by means of a stop watch, and the record was completed as soon as the signal was given of the bird having accomplished either of the measured distances. In four instances the birds went straight away, and the records were as under:

| FLIGHT OF PIGEONS IN THE OPEN. | TIME. Seconds. | RATE OF SPEED. | |
|-----------------------------------|-------------------|----------------------|--------------------|
| | | Yards per Second. | Miles per Hour. |
| 240 yards..... | 19 | 12·6 | 25·8 |
| 265 „ | 20 | 13·2 | 27·0 |
| 300 „ | 22 | 13·6 | 27·9 |
| 132 „ | 10 | 13·2 | 27·0 |

With reference to these results Mr. Griffith says: "I expected the free long flight would beat the chronograph velocities at 40 yards, but the reverse is the case. I imagine the reason is, that when started from a trap or basket, as these were, the birds fly in alarm at first, but when away in the open they do not keep up their full pace." In neither case, however, did these "blue rocks" come up to the average speed of the trained "homing birds" of which Mr. Tegetmeier gave particulars in the *Field* of the 22nd ult. There the average speed of the winning birds in eighteen pigeon races amounted to 36 miles an hour—the highest velocity, with a favourable

wind, being at the rate of 55 miles an hour. In Mr. Griffith's experiments the highest velocity was nearly 34 miles an hour, without any wind whatever.

Mr. Griffith's next task was to try similar experiments with partridges and pheasants, and for that purpose it was desirable to obtain a supply of good wild birds, as those kept in confinement could not be taken as fair representatives of the power of flight of birds which had always been at liberty. The difficulty, however, for many weeks, was to get such specimens as were wanted, the snow upon the ground and other circumstances being unfavourable to their capture. At length, however, some birds were obtained, all very wild and active, and last week Mr. Griffith proceeded with his experiments.

The conditions as to screens, &c., were as previously stated. Some of the pheasants were inveterate runners and would not rise to the screens at all; others rose fairly, but they did not all of them exhibit an equal degree of earnestness, and the best six records obtained were as follows, the first being that of a splendid bird, who went through the screens in fine style. The respective times and velocities are as follows:

| PHEASANTS IN THE 40 YARDS RANGE. | TIME. Sec. | RATE OF SPEED. | |
|-------------------------------------|---------------|----------------------|--------------------|
| | | Yards per Second. | Miles per Hour. |
| 1st | ·136 | 16·5 | 33·8 |
| 2nd | ·156 | 14·4 | 29·5 |
| 3rd | ·186 | 12·1 | 24·7 |
| 4th | ·189 | 11·9 | 24·4 |
| 5th | ·225 | 10·0 | 20·5 |
| 6th | ·139 | 16·2 | 33·1 |

Some of the birds were also timed in the open, and, as on the day of the previous experiments, there was no wind whatever. Two of the pheasants went away straight at

fine speed ; a third doubled back, and is therefore omitted from the record ; and the fourth went straight away, but with much less velocity than the first two. From the following records it will be seen that, contrary to the experience with the blue rocks, the pheasants attained their highest speed in the open :

| FLIGHT OF PHEASANTS IN THE OPEN. | TIME Seconds. | RATE OF SPEED. | |
|--|------------------|----------------------|--------------------|
| | | Yards per Second. | Miles per Hour. |
| 265 yards... | 15·0 | 17·7 | 36·1 |
| 220 „ ... | 11·8 | 18·6 | 38·1 |
| 140 „ ... | 10·6 | 13·2 | 27·0 |

The concluding experiment was with the partridges, which went fairly well at the screens, though they did not seem to exert themselves very much ; and the following were the records obtained :

| PARTRIDGES IN THE 40 YARDS RANGE. | TIME Seconds. | RATE OF SPEED. | |
|---|------------------|----------------------|--------------------|
| | | Yards per Second. | Miles per Hour. |
| 1st | ·172 | 13·1 | 26·8 |
| 2nd | ·188 | 12·0 | 24·5 |
| 3rd | ·194 | 11·6 | 23·7 |
| 4th | ·162 | 13·9 | 28·4 |

Here, in the range, the partridges did not fly so fast as the blue rocks ; but they did better in the open, so far as the records go. Only two of them, however, flew far enough to have their time recorded. The rest dropped to the ground before they got to the men who were stationed to signal their arrival. The speed of these two were as follows :

| FLIGHT OF PARTRIDGES IN THE OPEN. | TIME. Seconds. | RATE OF SPEED. | |
|---|-------------------|----------------------|--------------------|
| | | Yards per Second. | Miles per Hour. |
| 170 yards... | 12·6 | 13·5 | 27·6 |
| 220 „ ... | 14·0 | 15·7 | 32·1 |

Mr. Griffith says, in conclusion: "I think the velocities may be fairly taken as the speed of birds rising to the gun, and also of driven game when not aided by any wind."

Of course, when driven birds are going down wind with all the advantage of a strong breeze, the velocity of the wind has to be added to the natural speed of the bird. In order to afford an idea of the amount of assistance that would be rendered to birds flying down wind, a short table of velocities may be given. A wind moving at the rate of three or four miles an hour is scarcely perceptible; and other gradations in miles per hour, and feet per second, are as follows:

| Miles per hour. | | Feet per second. | | Miles per hour. | | Feet per second | |
|--------------------|---------|---------------------|-------|--------------------|--------------|--------------------|-------------|
| Gentle air | 7 | ... | 10·25 | | Gale | 40 | 58·68 |
| Light breeze | ...14 | ... | 20·50 | | Heavy storm. | 60 | 88· 0 |
| Steady breeze | ...21 | ... | 30·75 | | Hurricane | ... 80 |117·36 |

It will be seen that a mile per hour is just about equivalent to $1\frac{1}{2}$ feet per second.

EFFECT OF CHANGING POWDERS.

The following letters, which appeared in the *Field*, will no doubt be interesting, showing how one's shooting may be interfered with owing to the changing from one powder to another, when there is a difference in velocity, thereby upsetting one's calculation as to "time"—that is, in other words, as to the amount of allowance in getting the shot to the object to be struck—from the fact of one being slower than the other. This is not altogether dependent on gunpowders, because sometimes the construction of the lock may cause a longer interval from the pull of the trigger to the ignition of the charge. Such a source of error was made very apparent to me once when carrying out some trials with a flint-lock gun; one had to give a greater allowance, owing to the slow ignition. In the same way a hang-fire will also interfere with the shooter's calculations. A very difficult question has thus arisen for the inventors of new powders, etc., the faults of which have been very apparent when tested as to velocity with the chronograph.

COMPARATIVE TRIALS OF POWDERS.

SIR,—From time to time you have kindly published records of trials I have carried out, and I therefore have the pleasure of giving you full details of one carried out on the 22nd and 23rd inst. with black, Schultze, E.C., and the new J.B. powders, which I hope will prove of interest to your readers.

The powders were shot in the turn as numbered, the barrel wiped out after each kind; the force-gauge accurately tested with 8oz. between each powder; all charges weighed, both shot and powders.

12-bore B.L. trial gun, by Charles Lancaster; weight, 6lb. 2oz.; barrels, 31in., choke; distance, 40 yards; *Field* force-gauge; size of shot, No. 6 (270 to ounce); Eley's best cases used throughout; all shot from the same barrel. Fractions in averages not taken.

Trial No. 1.—42grs. J.B.; card, felt, cloth, 1½oz. shot, cloth; powder well pressed down; case well rounded over.

| Pattern. | | | Force oz. on gauge. | | Pellets on 10in. plate. | | Force per pellet. |
|----------|-----|-----|---------------------------|---|-------------------------------|---|-------------------------|
| 212 | ... | ... | 36 | ÷ | 19 | = | 18·9 |
| 246 | ... | ... | 113 | ÷ | 52 | = | 2·18 |
| 184 | ... | ... | 27 | ÷ | 15 | = | 1·80 |
| 231 | ... | ... | 110 | ÷ | 50 | = | 2·20 |
| 222 | ... | ... | 104 | ÷ | 47 | = | 2·21 |
| 198 | ... | ... | 60 | ÷ | 29 | = | 2·07 |
| 219 | ... | ... | 89 | ÷ | 42 | = | 2·12 |
| 208 | ... | ... | 80 | ÷ | 38 | = | 2·11 |
| <hr/> | | | | | | | |
| 215 | ... | ... | Average | | ... | | 2·07 |

(Figure of merit, 422.)

Trial No. 2.—42grs. E.C.; card, felt, cloth, $1\frac{1}{8}$ oz. shot, cloth; powder well pressed down; case well rounded over.

| Pattern. | | | Force oz. on gauge. | | Pellets on 10in. plate. | | Force per pellet. |
|----------|-----|-----|---------------------------|---|-------------------------------|---|-------------------------|
| 221 | ... | ... | 87 | ÷ | 40 | = | 2·17 |
| 230 | .. | ... | 96 | ÷ | 45 | = | 2·13 |
| 237 | ... | ... | 121 | ÷ | 58 | = | 2·08 |
| 224 | ... | ... | 94 | ÷ | 42 | = | 2·24 |
| 233 | ... | ... | 111 | ÷ | 51 | = | 2·18 |
| 218 | ... | ... | 80 | ÷ | 35 | = | 2·29 |
| 228 | ... | ... | 109 | ÷ | 48 | = | 2·27 |
| 220 | ... | ... | 84 | ÷ | 38 | = | 2·21 |
| <hr/> | | | | | | | |
| 226 | ... | ... | Average | | ... | | 2·19 |

(Figure of merit 445.)

Trial No. 3.—42grs. Schultze; card, felt, cloth, $1\frac{1}{8}$ oz. shot, cloth; powder wad just pressed home; case ordinary rounding over.

| Pattern. | | | Force oz. on gauge. | | Pellets on 10in. plate. | | Force per pellet. |
|----------|-----|-----|---------------------------|---|-------------------------------|---|-------------------------|
| 216 | ... | ... | 75 | ÷ | 37 | = | 2·03 |
| 219 | ... | ... | 86 | ÷ | 42 | = | 2·05 |
| 181 | ... | ... | 28 | ÷ | 15 | = | 1·87 |
| 206 | ... | ... | 75 | ÷ | 37 | = | 2·03 |
| 198 | ... | ... | 49 | ÷ | 25 | = | 1·96 |
| 210 | ... | ... | 67 | ÷ | 33 | = | 2·03 |
| 188 | ... | ... | 31 | ÷ | 17 | = | 1·82 |
| 227 | ... | ... | 101 | ÷ | 47 | = | 2·15 |
| <hr/> | | | | | | | |
| 205 | ... | ... | Average | | ... | | 1·99 |

(Figure of merit, 404.)

Trial No. 4.—3drs. C. & H. No. 6; card, felt, card, $1\frac{1}{8}$ oz.
shot, cloth; not pressed; ordinary rounding over.

| Pattern. | | | Force oz. on gauge. | | Pellets on 10in. plate. | | Force per pellet. |
|----------|-----|-----|---------------------------|---|-------------------------------|---|-------------------------|
| 221 | ... | ... | 73 | ÷ | 35 | = | 2.09 |
| 232 | ... | ... | 110 | ÷ | 50 | = | 2.20 |
| 219 | ... | ... | 84 | ÷ | 41 | = | 2.05 |
| 229 | ... | ... | 105 | ÷ | 48 | = | 2.19 |
| 209 | ... | ... | 62 | ÷ | 30 | = | 2.07 |
| 220 | ... | ... | 81 | ÷ | 38 | = | 2.13 |
| 225 | ... | ... | 89 | ÷ | 43 | = | 2.07 |
| 231 | ... | ... | 101 | ÷ | 46 | = | 2.19 |
| <hr/> | | | | | | | |
| 223 | ... | ... | Average | | ... | | <hr/> 2.12 |

(Figure of merit, 435.)

The above figures need no comment from me, except perhaps the very regular shooting in trials Nos. 2 and 4.

The next trials were of a more practical test as to the relative merits of the powders from a sportsman's point of view, viz., at moving objects, such as clay pigeons and very best blue rock pigeons.

With E.C., Schultze, and black, I found little or no difference, standing 30 yards from the clay pigeon trap. I made a good score, and good breaks; but when I used J.B. there seemed a falling off in the velocity, so that at first all my shooting was "too late,"—which term, I think, will be well understood by those who have attempted clay pigeon shooting at a long rise. I then altered my time allowance, and broke them as well as with the other powders.

The next trial was at the very best blue rock pigeons I could obtain, thrown up by an attendant standing 35 yards to the windward side, and allowing them to cross

me at right angles, so as to give fast crossing shots, thereby testing the allowance to be made. Here, again, I found my judgment correct with E.C., Schultze, and black, but on using the J.B. I found I was tailing my birds, although not really clean missing one. I then extended my amount of allowance ahead, and found I killed my birds well. Most of my shots were at from 30 to 50 yards from the gun; and, as there was a stiff N.E. wind, they crossed me at a great pace.

I fancy that many when first using J.B. will be very liable to wound game unless they get more ahead than they have been accustomed to allow. This I fancy is due to its slower combustion, which we have all been led to believe means loss of time, which you have so clearly pointed out in your issue of the 5th inst., p. 633.

CHARLES LANCASTER.

151, New Bond Street, W.

2nd June, 1888.

J. B. powder.—Mr. Charles Lancaster's trials are worth of the sportsman's consideration.

It seems to be generally accepted that the combustion with the above powder is slower than with the others, and, as Mr. C. Lancaster points out, this means a falling off in velocity—so much so that the shooting becomes “too late” and “tailing” birds the order of the day. We certainly do not want a powder by the use of which we shall be liable to wound birds, neither do we want our “time” spoilt. I have made some few experiments with the J.B. powder, and I cannot say that at present I find it equals either E.C. or Schultze in force, although the recoil, on account of the slower combustion, may be somewhat less.

Lord de Grey, I believe, shoots with No. 2 diamond grained black, and his lordship's "time" is excellent. Where would he be if he used "J.B.?" I do not object to quick combustion in a powder, in fact I rather prefer it, but then I use guns of sufficient weight to stand it, and I am frequently asked how it is they kill so well, and where I get my cartridges, &c.

PURPLE HEATHER.

SIR,—All gunners must have been much interested in the trials of J.B., E.C., Schultze, and C. & H. No. 6, by Mr. Charles Lancaster, as recorded in the *Field* of May 26, and must also be very grateful to him for such useful information, especially as regards the shooting at moving objects. I fancy it must be apparent to all that J.B. is the least suited of the four powders for ordinary sporting guns. The object of the shooter is to get his shot on to the bird as quickly as possible; therefore any extra time allowance must be a disadvantage to him. A clean kill, is of course, the desideratum. For heavy shoulder guns, however, and for punt guns, I should fancy that J.B. would be just the thing, as its slow combustion would lessen the recoil, and this is a great matter with heavy charges. Moreover, these guns are generally fired at birds at rest; and if on the wing, time allowance would be of less consequence in firing at a flock than in shooting at a single bird. It appears to me that J.B. would be admirably adapted for rifles, as the slow combustion, and consequently more gradual force imparted to the bullet, would prevent any tendency of it to strip or pass out of the barrel without taking the grooving. It also seems to me that J.B. might be used with great advantage for artillery.

I know very little about the manufacture of nitro-compounds, but I should imagine that the grain would have to be made larger for punt guns and cannon, as is the case with black powder.

F. S. H.

Lymington, May 28.

9th June, 1888.

SIR,—I enclose herewith results of trials as to velocities, which may interest you. I think they bear out my tests at moving objects, published in your issue of May 26.

CHARLES LANCASTER.

151, New Bond Street, W., June 2.

Trials at Hounslow Mills, May 29, 1888, of Cartridges for Mr. C. Lancaster, all at 120 ft. from Muzzle.

| Powder, | Velocities. | | Pressures. | |
|------------------|----------------------|------------|---------------------------|----------------------------|
| | Observed Velocities. | Mean O. V. | 1st Crusher. (1 inch.) | 2nd Crusher. (2¼ inch.) |
| | Ft. sec. | Ft. sec. | Per sq. in. | Per sq. in. |
| C. & H. No. 6... | 840 | 842 | 4400lb. | 4400lb. |
| " " ... | * | | | |
| " " ... | 840 | | | |
| " " ... | 850 | | | |
| " " ... | * | | | |
| " " ... | 850 | | | |
| " " ... | 820 | 790 | 3600lb. | 4150lb. |
| " " ... | 850 | | | |
| J.B. | * | | | |
| " | * | | | |
| " | 770 | | | |
| " | * | | | |
| " | 810 | | 3950lb. | 4500lb. |
| " | * | | | |
| " | 790 | | | |
| E.C. | 800 | 846 | | |
| " | 857 | 5375lb. | 5525lb. | |
| " | 853 | | | |
| " | 840 | | | |
| " | 880 | | | |

All cartridges loaded as per trial published in *Field*, May 26, 1888.

* The asterisks signify that charges were fired, but no records made, the wire of the chronograph screen not being struck by a pellet.

Since these trials were published, the J.B. has been somewhat improved, as will be seen from the following statement *re* New Issue of "J.B." Sporting Powder for 1889 :

The "J.B." Sporting Powder for 1889 will be found to differ from that previously issued in the following particulars:—

It is harder, and leaves less solid residue in the barrel after firing.

It contains less moisture, and is, therefore, even less likely to suffer disadvantageous change by prolonged storage of the cartridges loaded with same under conditions of great dryness.

It requires less pressure in loading to obtain the best results. In fact, the best velocities are obtained here when the first wad is simply pushed down until it rests firmly and evenly upon the powder charge. Loading in this way an average mean velocity, at 40 yards, of 870 feet per second is readily obtained from a choked barrel, and using 42 grains of powder and $1\frac{1}{8}$ oz. of No. 6 shot.

With the original J.B. powder, loaded with careful compression of $\frac{1}{8}$ -in., the velocity obtained from the same gun as above averaged 840 feet per second. Without compression, lower velocities were obtained, and to this must be ascribed most of the complaints as to the slowness of the powder.

It is to be observed that the above-mentioned velocity of 870 feet per second is superior to that obtained with Curtis & Harvey's No. 4 black gunpowder, from the same gun, and under the same atmospheric and other conditions.

SPREAD OF SHOT FROM GUNS OF DIFFERENT GAUGE.

Many are, no doubt, under the impression that 16, 20, and 28-bore guns will shoot their respective charges closer than the usual 12, and that they are harder shooting guns under those circumstances. I have never found this the case; and, in support of my opinion, insert the following letter, with editorial remarks, from the *Field* of the 22nd December, 1888, which fully endorse it:—

SIR,—I observe that your able correspondent “Purple Heather,” in the *Field* of the 15th inst., distinctly asserts that with 1 oz. of No. 6 shot a 20 or a 16-bore will not shoot closer than a 12. It would be interesting to know whether this is an absolutely reliable and thoroughly ascertained fact; for it is entirely contrary to the general opinion on the subject.

It constantly happens that a man, finding his shooting unsatisfactory with a 16-bore, and believing himself not to be a sufficiently good shot to use such a close-shooting gun, straightway discards the 16-bore, and provides himself with a 12, in the hope that his shooting may thereby improve. Whether his hopes are generally or ever realised may be quite another matter. Perhaps I may be allowed to relate my own experience on this point. It will be found in one respect to support the assertion of “Purple Heather.”

I am what may be called an indifferent shot—that is to say, though I manage to bag a good deal of game in a day's shooting, still I very often miss astonishingly easy shots. I have always been in the habit of shooting with a 16-bore, made by a first-class London gun-maker. However, last season some of my relations and friends strongly advised me to try a 12-bore—my gun-maker also gave me the same advice—all holding the opinion that only a very good shot should use a 16-bore, as it carried so close as greatly to increase the chance of missing the object aimed at. I allowed myself to be persuaded by such apparently cogent reasoning, and have shot with a 12-bore all through this season. The result has been most disappointing. I have not shot nearly so well as I did with the 16, and have had the trouble of carrying a heavier weapon ($6\frac{3}{4}$ lb.).

I am sorry I changed, but, before discarding my 12 and resuming my 16-bore, I intend to persevere a little longer, and load with only 1 oz. of shot instead of $1\frac{1}{8}$ oz., which, up to the present time, I have been using. I may add that both my guns are by the same maker, and fit me most accurately, the right barrel in each gun being non-choke, and the left modified choke.

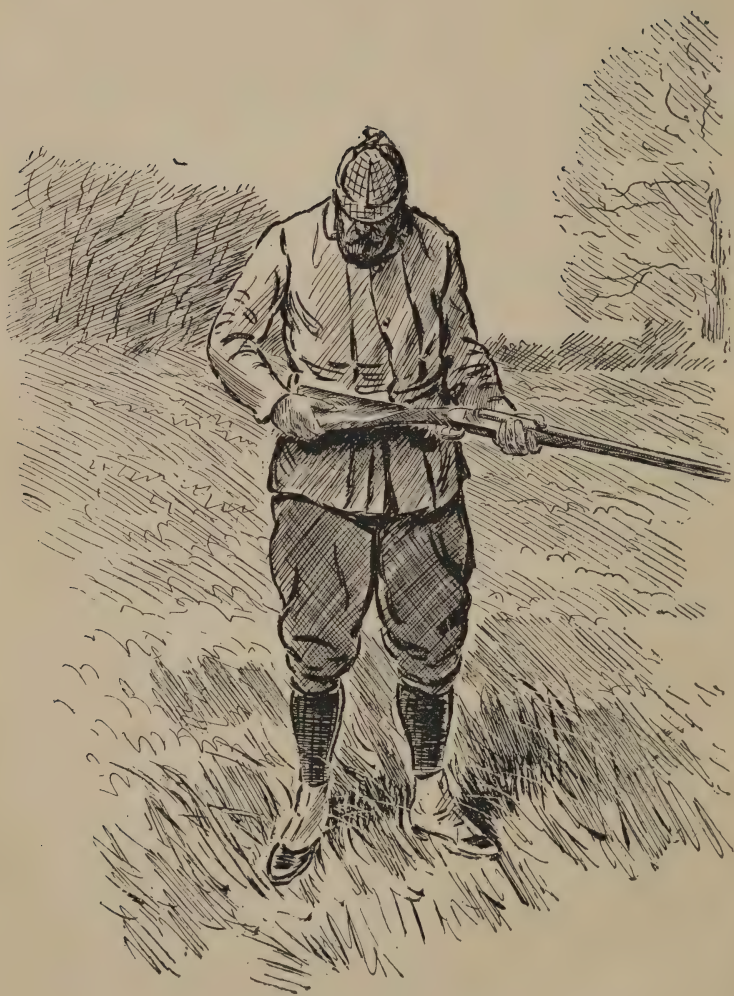
So far, therefore, I am inclined to agree with "Purple Heather," and believe that an average shot is likely to shoot every bit as well with a 16-bore as with a 12.

TIREUR.

[It appears to us that the spread of the pellets depends not so much upon the size of the bore as on the nature of the boring. Whatever may have been the case in the pre-chokebore period, the results of experiments with choked barrels go to show that, with equal charges of shot, the patterns of the small-bores are not closer than those of

guns of larger gauge. In the *Field Gun Trial* of 1879, there were twenty-three guns loaded with equal charges of shot (1 oz.), eleven of these guns being 20-bores, eleven 16-bores, and one 12-bore. The patterns of the 20-bores averaged 147, those of the 16-bores averaged 162, and that of the 12-bore was 183. Again, in our issue of April 14 last, particulars were published of the trial of a 24-bore gun and a light 12-bore, with equal charges of powder and shot; the 24-bore gave 154 pattern, and the 12-bore 200. And a few weeks ago another trial took place (*Field*, Nov. 10), in which the charges were not equal, but of the quantities that were used the 28-bore put 68 per cent. in the 30-in. circle, the 24-bore put in 69 per cent., and the 12-bore 71 per cent. But these were /choke-bores. With the average 12-bore cylinder gun, the portion of the charge put in the target at 40 yards is only 40 per cent., the remaining 60 per cent. being outside the 30-in. circle; and it seems probable, from what he states, that such a gun would suit "Tireur" better than a \choke-bore.—ED.]

The "art of fitting" a shooter requires the gun to be adapted in all its parts to the physique of the person to be fitted. The mere fact of shortening a stock to any length may still fail to bring the other parts of the gun within comfortable ease of handling to a short puny man; and the same will be the case if you shorten the barrels and leave the stock too long and awkward.

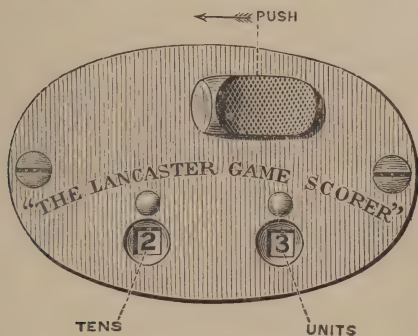


Scoring a Right and Left.

THE LANCASTER GAME SCORER.

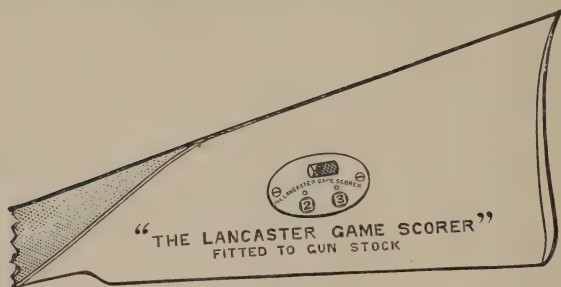
(From the Press).

A very simple, yet ingenious, game marker has just been introduced into the sporting world by Mr. Charles Lancaster, of 151, New Bond Street, W., and there can be no doubt whatever but that it will speedily become very popular. Many markers have been invented from time to time, with more or less success, but this new one (*see Ill. No. 50, opposite*) is calculated to outrival all its predecessors,



and become recognised as the marker *par excellence*. The first illustration we give is the exact size of the scorer, and from it anyone can readily see the working of it. We also give a second illustration, showing the scorer as attached to the gun stock. Very little wood indeed has to be removed from the stock in order to fix the marker, so that those sportsmen who have guns with the stock after the pattern of Turner's Featherweight, &c., can easily have it fixed to their guns; and another item to which special attention has been given in designing it, is to construct it in such a manner that it may go on the side instead of being let in

the top of the stock. As the working parts are made of



brass, there is no reason to fear they will be affected by rust; and, again, the whole thing is so light that the balance of the gun is in no way interfered with.

The manipulation of the marker is exceedingly simple (*see Ill.*) The slide is pushed forward by the thumb, and this movement does not require the hand to support the stock in the act of pressing, so as to insure the full movement of the thumb-piece. When the slide is pushed forward, the numbered wheel with the units turns round one number (giving a click in doing so), and when it has moved from 0 to 9 the second wheel, with the tens, is brought into contact, and caused by the same push to rotate one figure at the same time as the unit wheel brings the 0 into view. The same process of nine registrations has then again to be gone through before the decimal wheel is again brought into contact, and in this manner 109 may be registered before it is necessary to commence over again.

SHOT—NUMBER OF PELLETS IN A CHARGE.

(OF NEWCASTLE MANUFACTURE).

| Nos. | $\frac{3}{4}$ oz. | $\frac{7}{8}$ oz. | 1 oz. | $1\frac{1}{8}$ oz. | $1\frac{1}{4}$ oz. | Relative Number of Pellets. | Relative Weight (= Striking Force) of the Pellets. |
|----------|-------------------|-------------------|-------|--------------------|--------------------|-----------------------------------|--|
| 3 | 105 | 122 | 140 | 157 | 175 | 1·000 | 1·000 |
| 4 | 129 | 150 | 172 | 193 | 215 | 1·229 | 0·814 |
| 5 | 163 | 191 | 218 | 245 | 272 | 1·555 | 0·642 |
| 6 | 202 | 236 | 270 | 304 | 338 | 1·929 | 0·519 |
| 7 | 255 | 297 | 340 | 382 | 425 | 2·429 | 0·412 |
| 8 | 324 | 394 | 450 | 506 | 562 | 3·214 | 0·311 |

WEIGHTS OF POWDER CHARGES

IN DRACHMS, GRAINS AND GRAMMES.

1 Drachm = 27·34 Grains = 1·772 Grammes.

| | | | | | |
|----------------|---|------|---|------|---|
| 2 | „ | 54·6 | „ | 3·54 | „ |
| $2\frac{1}{8}$ | „ | 58·1 | „ | 3·76 | „ |
| $2\frac{1}{4}$ | „ | 61·5 | „ | 3·98 | „ |
| $2\frac{3}{8}$ | „ | 64·9 | „ | 4·20 | „ |
| $2\frac{1}{2}$ | „ | 68·3 | „ | 4·42 | „ |
| $2\frac{5}{8}$ | „ | 71·8 | „ | 4·64 | „ |
| $2\frac{3}{4}$ | „ | 75·2 | „ | 4·87 | „ |
| $2\frac{7}{8}$ | „ | 78·6 | „ | 5·09 | „ |
| 3 | „ | 82·0 | „ | 5·32 | „ |
| $3\frac{1}{8}$ | „ | 85·4 | „ | 5·54 | „ |
| $3\frac{1}{4}$ | „ | 88·9 | „ | 5·76 | „ |

CLOSE SEASON FOR GAME AND WILD BIRDS.

All dates inclusive.

| | ENGLAND. | SCOTLAND. | IRELAND. |
|----------------|-------------------------|------------------------|-------------------------|
| BLACK GAME ... | 11th Dec. to 19th Aug.* | 11th Dec. to 19th Aug. | 11th Dec. to 19th Aug. |
| GROUSE ... | 11th Dec. to 11th Aug. | 11th Dec. to 11th Aug. | 11th Dec. to 11th Aug. |
| PARTRIDGES ... | 2nd Feb. to 31st Aug. | 2nd Feb. to 31st Aug. | 11th Jan. to 19th Sept. |
| PHEASANTS. ... | 2nd Feb. to 30th Sept. | 2nd Feb. to 30th Sept. | 2nd Feb. to 30th Sept. |
| WILD BIRDS ... | 2nd Mar. to 31st July | 2nd Mar. to 31st July | 2nd Mar. to 31st July |
| HARES ... | None. | None. | 21st April to 11th Aug. |

* In Somerset, Devon, and the New Forest, 11th December to 31st August.

An Act has been passed which prohibits the killing of Sand Grouse in England, Ireland, or Scotland until the 1st Jan., 1892, under a penalty of 20s. for every bird killed, taken, or exposed for sale.

GUN LICENCES.

| | £ | s. | d. |
|---|---|----|----|
| LICENCE (ANNUAL) TO USE OR CARRY A GUN :— | | | |
| To expire 31st July | 0 | 10 | 0 |
| LICENCE TO SHOOT GAME : | | | |
| If taken out after 31st July, and before 1st November, to expire 31st July following .. | 3 | 0 | 0 |
| After 31st July, to expire 31st October following | 2 | 0 | 0 |
| After 31st October, to expire 31st July following . . . | 2 | 0 | 0 |
| For a continuous period of Fourteen days | 1 | 0 | 0 |
| GAMEKEEPERS (GREAT BRITAIN) :— | | | |
| To expire 31st July | 2 | 0 | 0 |

A Licence to kill Game covers a Gun Licence.

BOOKS ON SHOOTING.

CHARLES LANCASTER begs to draw the attention of his patrons to the following works, copies of which every sportsman should have in his library :—

“The Dead Shot, or Sportsman’s Complete Guide.” By
“Marksman.”

Published by Longmans, Green & Co., London.

“Shooting.” The Badminton Library. 2 vols. By Lord
Walsingham and Sir Ralph Payne-Gallwey, Bart.

Published by Longmans, Green & Co., London.

“Practical Hints on Shooting.” By “20-Bore.”

Published by Kegan Paul, Trench & Co., London.

And as the best, fairest, and most exhaustive work on
Guns, Rifles, Ammunition, &c.

“The Modern Sportsman’s Gun and Rifle.” 2 vols. By
the late J. H. Walsh (“Stonchenge”), Editor of the *Field*.

Published by Horace Cox, London.

And lastly,

“Notes on Shooting,” with instructions concerning the
use of Black Gunpowder. By an Old Manufacturer.

Published by Curtis’s & Harvey, London, and distributed
gratis to their Patrons.

CORRESPONDENCE ON DEFECTIVE SHOOTING.

The following Letters have appeared in the *Field*:—

8th January, 1887.

LESSONS FOR BAD SHOTS.

SIR,—I have read with much interest the correspondence about shooting that has appeared in your columns during the last fortnight. Valuable, doubtless, as much of the advice given may be, it, however, leaves the reader somewhat puzzled, as the various testimony given is slightly conflicting. Everyone must admit that an “ounce of practice is worth a ton of theory,” and it is doubtless far easier for a beginner to become a good shot by practical demonstration than by addling his brains over the various abstruse calculations that have recently appeared. I would offer a suggestion which, should it be carried out, many young men would doubtless avail themselves of. Personally, I am an execrable shot; why, I do not know. I have a good eye, play well at billiards, and am quite up to the average at a stationary object with a rifle; in fact, instead of improving as a game shot, I am retrograding. Sir, imagining that there must be others in the same plight, would it not answer the purpose of some sporting gentleman (himself a first-rate shot), desirous of increasing his income, to start a shooting ground somewhere in the suburbs of London, and advertise in your columns that he was prepared to give lessons in shooting? The ground might also be used by sportsmen to test new guns, and by this

means one could be sure of one's gun fitting one properly. With details I need not trouble you, but clay pigeons and other mechanical contrivances would, of course, be found there. Should the initiation of this idea be also a fisherman, he might find many pupils who would be glad to have a few practical hints from a past master in the art, such as throwing from the reel, casting, &c., as these matters do not come by intuition.

In conclusion, I can only say that I should hail with pleasure the knowledge of where I could be put up to such wrinkles as would make me a decent shot, and should be quite willing to give a fair *quid pro quo* for this instruction.

BAD SHOT.

3rd December, 1887.

LESSONS IN SHOOTING.

Some time ago there was a correspondence in your columns respecting "Lessons in Shooting," and I noticed that there were letters from some saying that they had shooting grounds, and that they gave lessons to those wishing for them. I should like to hear if any of your readers availed themselves of the tuition offered; if so, with what results. I mean whether any of them really benefited by them, both as to the fit of a gun, and also the art of handling it with effect. As I am rather a duffer, I should feel much obliged if these gentlemen would answer my inquiries in detail, and recommend me to the best man as a good professor.

H. H. N.

10th December, 1887.

SIR,—I notice a letter in the *Field* of last Saturday, signed H. H. N., asking if any of your correspondents can recommend a “good professor” to teach the art of shooting, &c. I strongly advise H. H. N. to pay a visit to Mr. Charles Lancaster, of 151, New Bond Street. I myself have learnt many valuable hints from him, and I have taken several friends of mine (who were, I may say, real “duffers”) to him, and they have all blessed me and their “professor,” inasmuch as they can now make very respectable bags. The fact is, that Mr. C. Lancaster is not only an excellent and painstaking “coach,” but he understands better than any gun-maker I have come across how to fit a man properly with a gun. I notice H. H. N. asks particularly about fit. Of course, the sportsman himself must state weight of gun he can conveniently wield during a long day’s tramp. This is a very important question, as I have lately discovered.

I may mention one fact, which will, I think, show that Mr. Lancaster can assist in the art of shooting. I met Miss Annie Oakley the first day she shot at his private grounds, and I was also present when she first came to our club ground (the Gun Club). At this period Miss Oakley could kill about one blue rock out of five. After Mr. Lancaster had finished his course of instruction she killed forty-one rocks out of fifty, and for this performance she selected her Lancaster 20-bores—a pair of beautiful guns built for exhibition shooting—in preference to her Lancaster 12’s. Miss A. Oakley had previously told me that “her ambition was to kill thirty-five blue rocks out of fifty before she left England.”

PURPLE HEATHER.

SIR,—I have great pleasure in being able to put H. H. N. on the right road to getting some lessons in shooting. Mr. C. Lancaster, gun-maker, New Bond Street, has a capital practice ground about one mile and a quarter from Willesden Junction (on the London and North Western), where he is always ready to give his advice and attendance.

If H. H. N. is really “rather a duffer,” but still ready and willing to learn, I feel sure that Mr. Lancaster will be able to teach him, as he not only supplies everything in the way of pigeons and glass balls, &c., but he has also the happy knack of being able to “spot” exactly what are the faults of his pupil, why he misses, and to get him to correct them. Personally, I am certain that my shooting is infinitely better since I shot on his grounds.

BLACK AND RED.

SIR,—I should advise H. H. N. to take lessons in shooting from Mr. Charles Lancaster, of 151, New Bond Street. Mr. Lancaster gave me some lessons at his private grounds, and I was greatly benefited. Should H. H. N.’s guns not fit him, I am sure Mr. Lancaster would make the necessary alterations.

M.

SIR,—In reply to your correspondent H. H. N., I have the pleasure of recommending Mr. Charles Lancaster, of 151, New Bond Street, as being well able to give lessons in shooting. I consulted him some time ago as to the reason of my missing rocketting pheasants, when I was able to shoot with good results at other game, but could not manage to shoot well in covert. He very kindly waited upon me for a whole day, watching my shooting carefully,

and after each beat suggested certain points for me to watch. This I did, and I am glad to say with satisfactory results, so much so, that at the two last stands my average of kills was so much increased over what it had been previously, that lookers-on could hardly believe that I was the one shooting. From Mr. Lancaster's conversation, I gathered that he had a very great knowledge of the art of shooting; and I am sure that if H. H. N. will pay him a visit, he will learn more in half-an-hour than he could by himself in a whole season.

G. R. B.

Gloucester, Dec. 7.

SIR,—In answer to your correspondent H. H. N.'s query *re* "Lessons in Shooting," I recommend him to apply to Mr. C. Lancaster, New Bond Street, who will soon teach him all that can be taught in the art of shooting.

Being myself an elderly party, scarcely ever having handled a gun, I went to him last winter and took several "lessons" at his shooting ground.

At first I could not "hit a haystack" but after a little practice, and with a gun which Mr. Lancaster had "sided" for me considerably (which, being rather round and broad chested, I require), I could kill easily thirty-six out of forty-eight pigeons, if not more, and was thus initiated into handling a gun.

To become a good shot requires years of practice; coolness is the chief requisite—beginners, like myself, young or old, are always too quick; however, I may add that I took a small "shoot" this season, for the first time in my life, and have had very good fun, and fairly good sport.

A LOVER OF COUNTRY LIFE.

SIR,—In reply to the enquiry of H. H. N. regarding lessons in shooting, I can, from personal experience, strongly recommend Mr. Charles Lancaster, of Bond Street, and can also testify to the excellent arrangements at his shoot-ground near Willesden Junction.

I may add that I am, like H. H. N., a bad shot, and require a gun of peculiar shape. Mr. Lancaster recently built one for me, and I cannot speak too highly of the trouble that gentleman took to fit me, and of his invariable courtesy and attention.

L. W.

SIR,—Having been for years much the same sort of shot as H. H. N. describes himself, I am glad to give him my experience. I could shoot rabbits a little, but nothing else. After getting my gun altered to fit me, I took three lessons from Mr. Charles Lancaster, and he taught me to shoot birds. I have not had a day's covert shooting since being coached, but have had two or three small days after partridges, with the result of killing a brace clean where formerly I would have only "knocked down" one bird. I have reason to think the improvement in the case of pheasants would have been still more marked, especially as a long shot requires so much more skill than a close one.

I can confidently recommend your correspondent to try Mr. Lancaster. I am sure he could not have a better coach.

J. STRAKER.

Temple, Dec. 7.

SIR,—This season Mr. Charles Lancaster built me a gun, and gave me some instruction. I am exceedingly pleased with the result, having derived great benefit both from the fit of the gun and the tuition. If H. H. N. requires further information I shall be happy to give it him if he will communicate with me.

CHARLES J. WILSON.

Junior Constitutional Club,
Regent-street, S.W., Dec. 8.

5th January, 1889.

SIR,—Your correspondent “Duffer,” in his letter in your issue of the 8th December, headed “Improvement of Defective Shooting,” asked how I proceeded in order to improve my shooting. I could not reply to that question in few words, as it took me a long time to work out the answer to the riddle; but, speaking generally, I may say that the causes which give rise to bad shooting cover an extremely wide ground. They are certainly not to be compressed within the limits of a single letter; and without a previous knowledge of the individual and his surroundings, I should as little think of venturing to account (even were I a professed teacher in the art of shooting, which, be it distinctly understood, I am not) for defects of workmanship in a particular case, as I should attempt to give a rational answer to the inquiry, which from time to time appears in papers devoted to the interests of ladies, “Why do my servants lie in bed so late of a morning?”

I have, however, been asked a direct question, viz., “What gun-maker has successfully fitted me?” That I can answer. It was Mr. Charles Lancaster, of 151, New

Bond Street, W. I one day saw a letter in the *Field*, stating that Mr. C. Lancaster was an adept at fitting a customer with a gun. I forget who wrote it, but after my sorry experiences you may readily believe that I perused it with avidity. I had no previous personal knowledge of Mr. C. Lancaster, but I forthwith determined to make his acquaintance. Now, I am not such a fool as to say that Mr. Charles Lancaster is the only gun-maker in the world who can properly fit a man with a gun. I will simply tell some of your inquiring correspondents what he did for me.

I had been using a gun with which I could shoot, if I do not say really well, at all events with the greatest "confidence" and comfort. I have an abhorrence of talking about "how many head I killed in how many shots," and I am not keen on purchasing a "Gallwey Game Marker," or a "Lancaster Game Scorer," as I rarely count the pheasants, rabbits, hares, &c., that I bag, strange though it may seem to admit such an error; still, I may say that with my old favourite gun I do remember that I have frequently in covert shooting killed twenty-five head out of twenty-eight shots; at times I have bagged five-and-forty head in fifty shots. These instances are, of course, rare. I was never one of your "never miss gentlemen." My motto is "shoot liberally and don't pick your shots." I merely mention the above facts in order to show that I had some reason for alarm when, with my new guns I found myself bagging five, ten, or fifteen head out of forty or fifty shots. I knew and felt I ought to do better. Many and many a time I have been told that a "good workman does not complain of his tools." Still, I went on in my own way, and at last got hold of a gun that did suit me.

After trying choke-bores, cylinders, heavy guns, light guns, short stocks, long stocks, 30in. barrels, 28in. barrels, guns heavy forward, then the reverse, I called one day upon Mr. C. Lancaster, and overwhelmed him with facts of what I could do, and could not do (I admit it was principally of what I could *not* do); at all events I was "exuberant with my own verbosity," and eventually I wound up almost breathless with the words, "Do you think you can fit me with a gun?"—"I have no pattern for you"—"I have lost my favourite gun." Mr. Lancaster is not a man of many words. He did not say, "Oh, yes; I can fit you splendidly;" he said "I should prefer first to make you a plain gun, which you can try, and then we can alter it if necessary; you can then decide whether you prefer to keep it or have a best quality gun." I saw, however, by his quiet businesslike manner that he knew what he was about. I told Mr. Lancaster that I had been accustomed to a stock of evidently somewhat unusual and old-fashioned shape, and when I threw a trial gun or two up to the shoulder, while he was standing at my side, I did my level best to put them up as I would when in the field (though this is difficult to do), and he made his notes. In due time I received the new gun, and I can honestly say a complete metamorphosis took place in my shooting. In my first trial trip (I happened to get an invitation to stay with a friend who had a little piece of shooting; he said, "Bring your gun, as you may get a shot at a pheasant;" and so I took it) I had thirteen shots. I did take notice of what I killed the first few times I went out with my new weapon, for obvious reasons, and I bagged in a couple of hours eight pheasants, two hares, and two rabbits—a nice pretty little mixed bag for about a couple of hundred acres of shooting, late in the year.

I will not weary your readers with my successive exploits; but I got on so well that I have had four guns of Mr. Lancaster since my first trial one, and I really do not think that I can speak too highly of what Mr. Lancaster has done for me. In my own individual case I consider that he has been extraordinarily successful. He has "picked up" my shooting—well, what shall I say—50, or even 75, per cent.? And he had nothing to guide him. I think it speaks volumes for his aptitude for fitting customers with "a proper stock," as your correspondent wrote, and to him, though I forget his name, I owe a deep debt of gratitude for having put me on the right track.

Now, everyone "sticks" up for his own gun-maker, and, as I have been asked the question "Who improved my shooting?" I have much pleasure in paying a just tribute to my kind and painstaking gun-maker. Mr. Lancaster gives lessons in shooting. I have not myself had any from him, though I have learnt many valuable hints when trying guns at his excellent private shooting grounds; and, as I may be somewhat prejudiced in his favour, I would recommend your correspondents to get what I have said about his "fitting powers" "coaching ability," &c., verified by some of his pupils. I am sure he would send testimonials written by them to those of your subscribers who wished to see them.

Mr. C. Lancaster is now building me a new hammerless gun. I was once having a very prolonged conversation with my dear old friend "20,000 Shots" on the subject of hammerless guns. You must know, Sir, that he and I have a battle-royal when we get together about "chokes and cylinders;" but he is such an accomplished Sportsman, and such a fascinating man to talk to in so many ways, and so full of anecdote, that it is with the greatest

difficulty that I can tear myself away from his company when we meet. Well, with reference to hammerless guns, "20,000 Shots" said, "I prefer hammer guns; but I suppose you must go with the time, and such being the case, you are safe in trying Mr. C. Lancaster's action." "20,000 Shots" will, I daresay, remember the occasion to which I refer, when we kept his excellent wife waiting two hours for lunch! But, Sir, you know what it is when Sportsmen or enthusiasts get together! Some people have whispered "lunatics!"

PURPLE HEATHER.

“LAND AND WATER” AND “SHOOTING.”

15th September, 1888.

FAILURE IN SHOOTING.

SIR,—I have noticed with great pleasure that your columns are open at all times to the letters of those who are anxious to expose either their efficiency or failure in matters appertaining to sport in all its branches. I therefore have a certain satisfaction in writing this letter, when I know that it will be duly published and not consigned to the waste-paper basket. I am obliged to confess that I am a complete failure as a shot—not as a marksman with a rifle, but as a decent shot with a gun at game on the wing and at ground game. I therefore write to you in the hope that some of your many readers may be able to render me some assistance in imparting that knowledge so essential to teach one not only how it is done, but how it is done with the greatest amount of success.

E. F. A. Y.

SIR,—I see that your correspondent, “E. F. A. Y,” in your issue of the 15th inst., addresses you on the above subject. I shall be pleased to place my services at his disposal if he will favour me with an appointment, because I make a special feature in giving lessons at my private shooting-grounds in the “art of shooting,” and, I am pleased to say, with a considerable amount of success, which no doubt many of your readers will be able to testify, as I have had the honour of coaching so many gentlemen for some time past.

I find that in many cases the sight is at fault, in others the fit of the gun, and very often the left eye is doing that work which the right should, consequently such a sight causes the shooter to shoot very wide of the object he is desirous of hitting.

CHARLES LANCASTER.

151, New Bond Street, W.

SIR,—Noticing a letter from “E. F. A. Y.” in your issue of the 19th inst., it has occurred to me that my experience may be of some use to your correspondent. Until the last fortnight I must confess to have been quite as complete a failure as a shot as “E. F. A. Y.” but, with a great desire to become a fair shot (if possible), I pocketed my pride, and placed myself in the hands of Mr. Charles Lancaster, of 151, New Bond Street, who, in a few lessons at his grounds at Willesden, greatly improved my shooting. The last time I was there I managed to kill with several right and left shots; and, with luck, before the end of the season I hope to be able to describe myself as

AN AVERAGE SHOT.

September 22.

SIR,—“E. F. A. Y.” asks how he can become a good sporting shot. Let me recommend him to write to Mr. Lancaster, the well-known gun-maker, 151, New Bond Street, and make an appointment with him at his private shooting grounds near Willesden. Mr. Lancaster will give him every possible advice, being a first-class shot himself, and will supply him with clay or live pigeons for practice. With regard to myself, I can only say that my shooting improved wonderfully after a few lessons at his grounds.

September 22.

A. P.

SIR,—I have read the letter from your correspondent, “E. F. A. Y.,” in your issue of the 15th inst., and I would recommend him to place himself in the hands of Charles Lancaster, of New Bond Street (the celebrated gun-maker), who gives lessons in shooting at his own grounds, and who pays special attention to the fitting of his customers with a gun, and knows how “it is done” in the field, and can impart the necessary knowledge to enable one to become a decent shot. He has coached me recently, and also shot with me in the field, so as to impart the etiquette of shooting, which is so difficult to pick up from one’s friends, as it is not everyone who cares to acknowledge their ignorance, nor to trouble them to teach when intent in the pursuit of game.

I am sure “E. F. A. Y.” would soon learn what he desires, as Mr. Lancaster tells me he has coached many gentlemen with a great deal of success.

C. H. E.

Huntingdon, September 20.

SIR,—Since you published the letter from “E. F. A. Y.” I have scanned your columns with even additional interest, hoping that some expert in the use of the shot-gun would imitate, in regard to that weapon, the kindness recently exhibited in your valuable paper by that master of the rifle, Sir Henry Halford. Probably no one of your readers needing such instruction, given the time and opportunity, would hesitate to place himself under the able tuition of Mr. Charles Lancaster; but to a number of people of very moderate means, and living in the Midland Counties, the advice, however excellent, is impracticable. I do not think,

Mr. Editor, you will be so hard upon people of modest means as to say, if they cannot afford the means of proper instruction, they should turn their attention to some other mode of recreation. We cannot help, Sir, being attracted more to one pastime than another, and this particular one certainly has the merit of being an incentive to outdoor exercise to people whose occupation necessarily entails very close confinement. I hope still that some one of your sporting readers will vouchsafe a hint or two to their less favoured brethren.

ANOTHER FAILURE.

SIR,—I have to thank those gentlemen who have so kindly written to you in reply to “E.F.A.Y.’s” enquiries respecting my giving lessons in shooting, but I see your correspondent, “Another Failure,” writes hoping that some expert in the use of the shot-gun would give practical hints on the art of shooting with a gun in a similar way as Sir Henry Halford had on the subject of rifle shooting, because he (and no doubt many others) could not avail themselves of my tuition, partly on account of expense, but really because of living at some distance from London.

I have, therefore, much pleasure in informing “Another Failure,” through your columns, that as so many gentlemen have asked me to write a work, I have determined to compile a small “Treatise on the Art of Shooting,” in which I shall do my best to produce an unpretentious little work, but, at the same time, collect the opinions of the highest authorities on the subject, together with hints, which I hope may be useful to many. The chief novelty will consist in a number of carefully executed diagrams, illustrating

the best method of carrying out certain shots, whereby the novice may learn "angles," which are so essential for the making of an average, if not first-class shot.

CHARLES LANCASTER.

151, New Bond-street, W.

P.S.—I shall be glad to receive suggestions from any of your readers who fancy they can, by doing so, improve the usefulness of the little work in question.

SIR,—I want to give an idea to our friend who wishes to improve, and it is one which does not seem to occur to him. Let him go out shooting quite alone, and if he finds an improvement he may have great hopes for himself. Many a man is made terribly nervous by shooting in a crowd, and being walked too fast. One dog alone to hunt up the birds, as a spaniel or terrier, which needs no control, is best. No one to mock the misses, not even a boy with him; let him carry his own game, probably very little, and eat only what he bags. He will soon become a steady shot, I fancy, unless the sight is defective. If the above prescription is fairly tried, please to inform.

RED SETTER.

SIR,—As your correspondent, "E. F. A. Y." has not as yet had many answers concerning "Failure in Shooting," possibly I may be able to help him a little by giving what I consider to be the chief cause of bad shooting, arranged numerically according to their relative frequency of occurrence. I hope others of your readers will also give their opinions of the cause of misses which they have observed.

I should commence with the most common cause :—

1. Flurry at seeing and hearing game rise ; this leads to hurry, and
2. Carelessness in aiming, the aim not being sufficiently exact.
3. Some defect in the sight, such as the left eye being the more powerful, etc.
4. Misfit of gun.
5. Nervousness, occasioning flinching and depression of muzzle at moment of firing.

Of course it is impossible to say which of these faults apply to “E. F. A. Y.,” but if he can decide for himself and inform you, Mr. Editor, or your correspondents, I think he would be more likely to get the information and remedy he requires. At the same time he should remember that “Rome was not built in a day,” nor was the art of shooting acquired in a like period of time, and that faults once learnt are very difficult to unlearn.

MIDLANDS.

SIR,—I beg to give a few suggestions to anyone who is a failure in shooting. Let the person who wishes to become a fair shot get a suitable gun, go out as often as he can, bring up his gun quickly and firmly to shoulder to every living and moving object he may come across, taking aim, cover, and following the object, but not firing. He should go on that way for ten minutes or so, and fire an odd shot when he has the object well covered, but keep the gun going along with the mark when pulling. Tricky practice that way for a week or so will ensure his becoming a shot very soon. It is not by throwing up the gun and blazing at everything that one becomes a shot. The shooter must

keep cool and have confidence, and keep his eye open and see where his shot strikes, and there is no fear of anyone not becoming a shot. He must be sure he can kill with the first barrel before using the second.

KEEPER.

HINTS ON GUNS AND GUN-MAKERS.

BY E. P. G.

A good gun adds very much to the pleasure of shooting,—one that will kill everything at a reasonable distance, and at the same time will kill anything the shots strike at 90 or 100 yards,—such a gun will be found in 12-bore cylinders, loaded with $3\frac{1}{4}$ to 4 drms. of black powder, $1\frac{1}{8}$ shot, and its weight should not be less than $7\frac{1}{2}$ lbs., and its length of barrel 32 inches. I have come to this conclusion after 30 years' experience, having used all sorts of guns, by all sorts of makers, and at all sorts of game.

Avoid cheap guns, as they all have their peculiarities, which have to be discovered by the shooter after spoiling his sport for one or two seasons.

Avoid ready-made or second-hand guns, for they may not fit you.

Avoid choke-bores. This very crude idea was, I suppose, taken from the nozzle of a fire engine, but it should be remembered that the gun shoots shot and not a column of water; the choking gives greater resistance to the air passing through the nozzle, and hence greater compression to the air in the barrel, and therefore more resistance to the explosive force of the powder.

Avoid light 12-bores, because they cannot at present be loaded properly with black powder without unpleasant

— recoil, *i.e.*, kicking. A 20-bore, loaded with $2\frac{5}{8}$ drms. and $\frac{7}{8}$ oz., is a splendid light weapon, and, in my opinion, is very superior to any light 12-bore.

It has been found that 30 inches is the best length of barrel for a 7 lb. gun, using 3 drms. of black and $1\frac{1}{8}$ shot, taking pattern, penetration and handiness into consideration; shorter barrels would answer better for small charges, but then a smaller bore than 12 would be preferable.

Balance, finish, engraving, etc., are matters for an unknown, and many gun-makers can turn out a gun perfect in these joints.

The fit of a gun is of the utmost importance, and to ensure this, get an artist in gun-making to measure you; it is impossible to give any rules as to length of stock, bend and cast-off. I don't know whether I am right in calling the angle between the line of the stock and the axis of the barrel "cast-off," but I am perfectly sure that these are important points in the building of a gun, and where a gun-maker, who has studied the question of sight, can show to the greatest advantage. I have travelled all over England, having been engaged in engineering, and have always gravitated to the gun-maker's shop for a talk, and can safely say I have only seen one man who has the slightest knowledge of the subject, and I am sure it will repay any true lover of a gun to make a special visit, as I have done on two occasions, to 151, New Bond Street, London; he will there hear, see, and have explained to him some most interesting and peculiar facts with reference to gun-making, and will regret that he did not sooner make the acquaintance of Mr. C. Lancaster.

The following is a sample of the many letters received by the Author from his pupils:—

“November, 1888.

“SIR,—I write, as I said I would, to tell you I have decidedly benefited in my shooting by the coaching I received from you last spring. I am shooting much steadier, and kill cleaner; in fact, shooting much better all round. I am shooting here with a gentleman with whom I also shot last season, and he, himself a very good shot, told me I shot a great deal better this year than last, without my asking him if he noticed any improvement in my shooting. My gun fits me all right now, as is testified by my killing much better, and missing far fewer easy shots. I am sorry to say I sometimes still commit the old fault of taking the gun from my shoulder between right and left barrels. In the case of pheasants coming over my head I don’t think I do it at all, and not so much in the case of hard shots, when it seems probable I will require the left barrel; but where I do it is when I get an easy shot with the right barrel, then I unconsciously take down the gun without waiting to see the effect of my first shot, and should I have missed I require to put up the gun again for a second shot. Of course I still miss some shots by shooting behind, but far less than last year. I hope I will soon get out of the habit of putting down the gun between shots. I suppose there is no way of stopping it but practice and trying to remember. I write this letter that you may know the result of your coaching, which I thought would interest you.

“Yours faithfully,

“M.”

“Mr. Chas. Lancaster,

“New Bond Street, London.”

Miss Annie Oakley (Little Sure Shot), the celebrated American Lady Shot, who visited England in 1887 with Buffalo Bill's Wild West Show, writes :—

“NEW YORK, 8th Dec., 1888.

“DEAR SIR,—The four breech-loading hammerless guns you built for me are, in my opinion, as near perfection as it is possible to get them. The pair of 20-bores (weight 5 lbs. 2 ozs.), I have been using now nearly two years. I find them just as tight and sound as when new; I have never had any repairs except having the locks cleaned. The pair of 12-bores (6 lbs.) are as good as the 20's.

Since using your guns, and receiving a few lessons from you at your splendid private shooting grounds, my shooting in the field has so much improved that now I always make a good score, even at fast and difficult birds. With many thanks for the pains you have taken in making me such perfect fitting and fine shooting guns.

“I am, gratefully yours,

“(Signed) ANNIE OAKLEY,

“(Little Sure Shot).”



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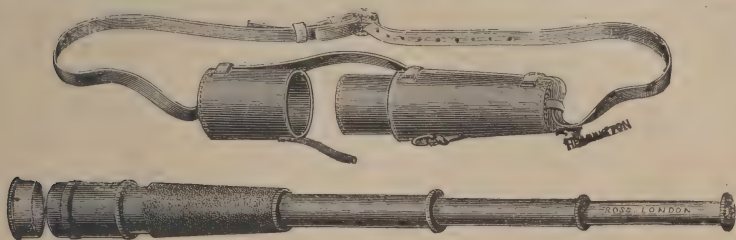
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AWARD
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GUNPOWDER.

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SPECIALLY SUITABLE FOR
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As originally made by this House.

Vide "FIELD," June 5th, 1885.

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Send for Particulars and Prices. When Ordering send Size of Head.

SHOOTING CAPS.

EXTRACT FROM "FIELD," DECEMBER 22nd, 1888.

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"Having now worn one for three months, and having tested on the stubbles in a hot September sun, on the moors in a cold wind grouse driving, and in the covert in drizzling rain, we should have no hesitation in saying that it is **all that a Shooting Cap should be.** It is warm, light, and comfortable, and as **waterproof as a cap can be that is not made of mackintosh.** The material is deer-skin of a brown colour, light or dark shade, according to fancy, and neatly quilted inside. It is made in **two or three different shades to suit individual taste;** but that known as the 'Deerstalker' shape, fitting close to the head, with a peak fore and aft, is that which will probably commend itself to the majority of sportsmen."

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Vide "FIELD," May 23rd, 1885.

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vide “SHOOTING TIMES.”

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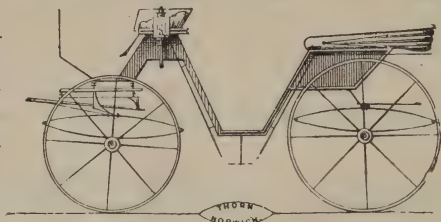
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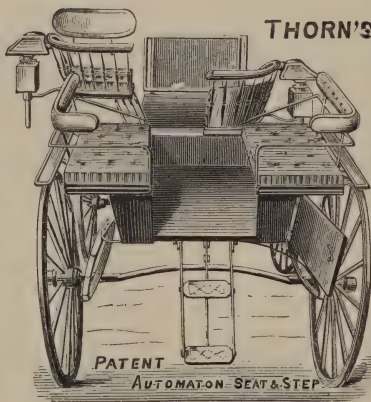


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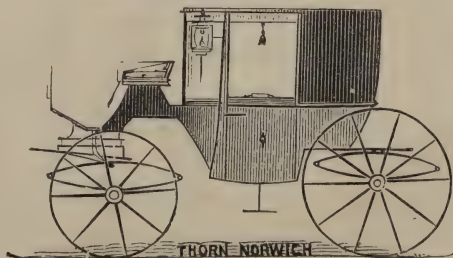


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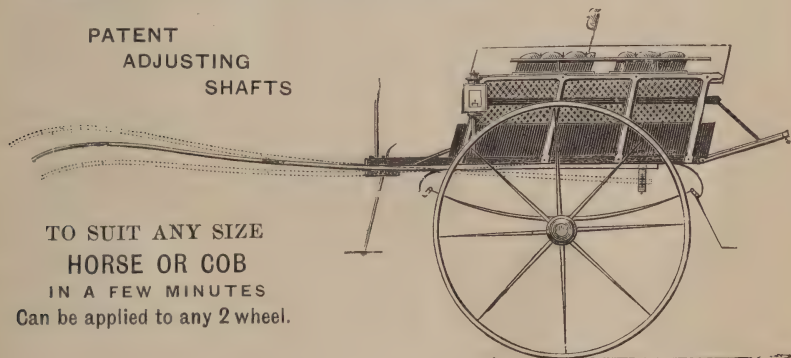
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